MINING WORLD

in this issue

How Geophysics Found Pima Copper

Page 42

Low Cost—High Production

Eimco 105 tractors with excavating attachments are increasing production underground and reducing the cost per ton mined. Eimcos, built to dig in hard rock, are heavy duty machines for continuous heavy duty work.

THE EIMCO CORPORATION
Salt Lake City, Utah, U.S.A.
Export Office: Eimco Bldg., 52 South St., New York City

OCTOBER 1954

Vol. 16 - No. 11

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with JOY DUAL-VALVE SILVER STREAK DRILLS

In tunnels, crosscuts, drifts, or stopes, Joy *Silver Streak* Rock Drills with the DUAL VALVE will do your drilling job faster, and use less air with lower maintenance. Here's why—

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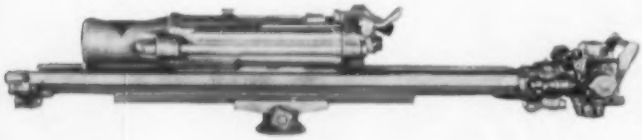
(2) The silver-like cadmium plating on Joy *Silver Streak* Rock Drills aids lubrication while running-in, protects parts from rust while in stock, and keeps maintenance costs at a minimum.

The Joy line is complete. There's a *Silver Streak* rock drill for every rock breaking need. Types included are drifters, stopers, hand-held drills, Hydro Drill Jibs. To complete the line, there are wagon drills; the QB-20 for line drilling and dimension stone quarries; rubber-tired, self-propelled Drillmobiles; and specially mounted drills for special needs. Let our Field Men work with you. • *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada, *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

JOY DUAL VALVE

"Makes Air do More Work"



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For use on mobile jumbo units, as at right, or for column mounting, Joy Drifters are built in three sizes—all with fast, powerful Dual Valve action. Efficient Pistonmotor Feed, with only two moving parts, provides strong, steady, advancement and retraction. One-piece locking chuck increases bearing area and reduces wear on lock ring and chuck bushing.

Consult a Joy Engineer

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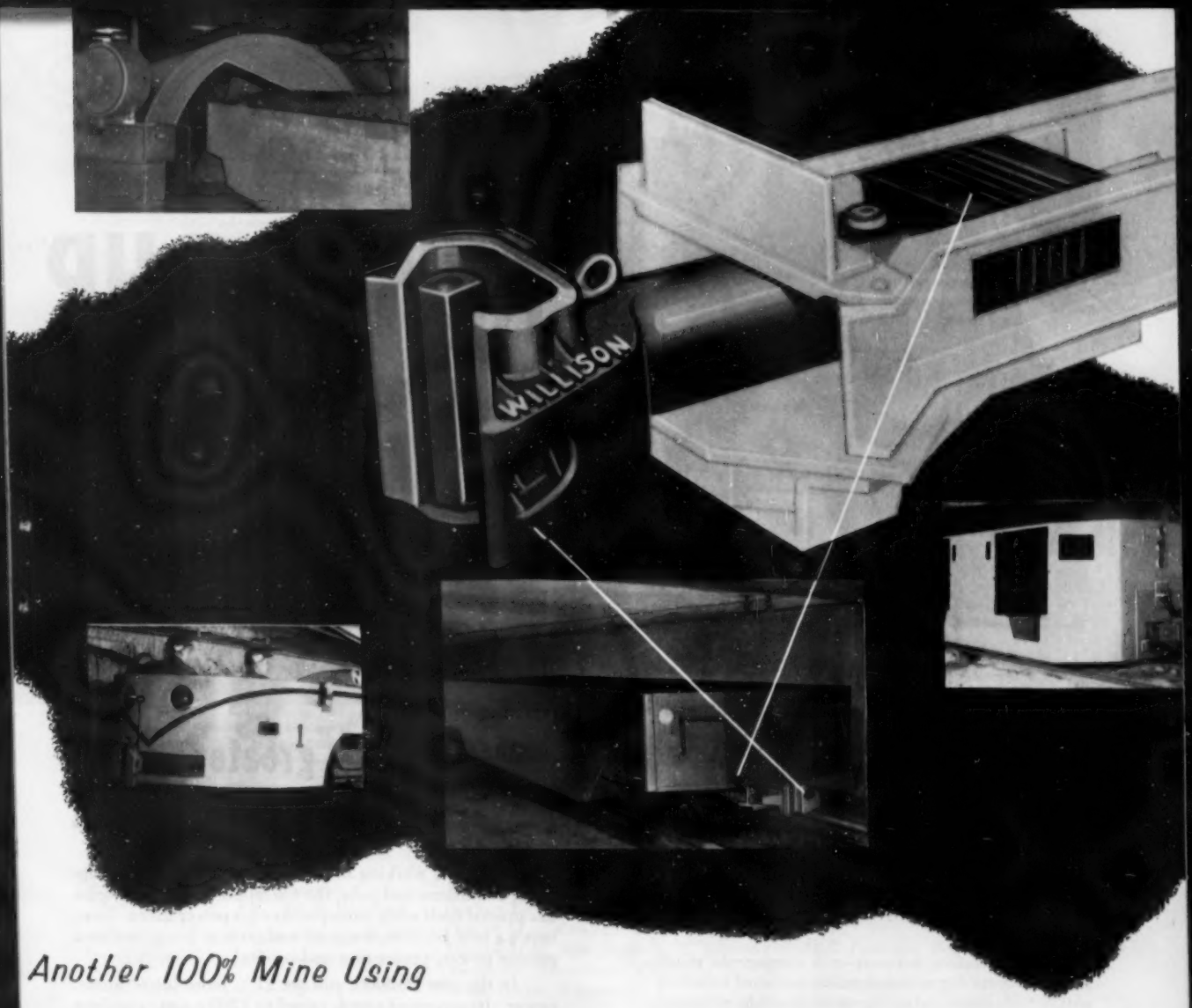

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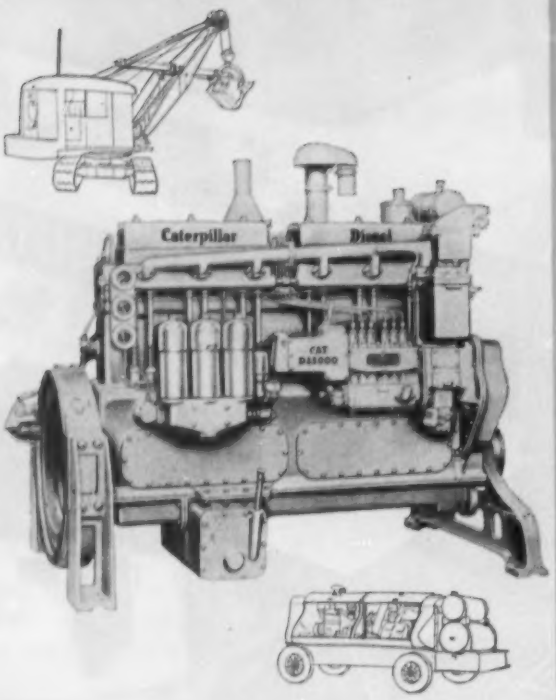

Announcing the

NEW 190-HP CAT* D13000 ENGINE

CATERPILLAR ADVANCED DESIGN FEATURES IN THE NEW D13000

While retaining such time-proved features as aluminum alloy main and connecting rod bearings, "Hi-Electro" hardened and Superfinished bearing surfaces, exclusive Caterpillar fuel injection system, ability to use low-cost No. 2 furnace oil without fouling, etc., the new D13000 incorporates many new features, among them:

NEW Valves, Inserts, Rotators—new components, standard in the breathing system, combine increased breathing ability with longer valve life—make possible additional horsepower output and lower maintenance costs.

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NEW Camshaft—improved high lift cam profiles give smooth valve seating and increased breathing ability. This increased capacity, also made possible by new oil-bath air cleaner and larger intake and exhaust manifolds, insures low exhaust temperatures and adequate reserve power.

NEW Water Pump—larger, with a greatly increased capacity to answer cooling needs of this modern, high-powered diesel.

NEW Pistons—oil-cooled, made of high-strength, lightweight aluminum alloy with stainless-steel heat plugs in the high-temperature zone and cast-in iron bands for the top ring groove to give best service at lowest final cost.

NEW Oil Pump—features not just one, but two pressure controls to assure correct lubrication for all moving parts from the first turn of the crankshaft.

For complete details, specifications, attachments, etc., see your nearby Caterpillar Dealer

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For jobs requiring power in the 145 (continuous) to 190 (intermittent) horsepower range, your best buy is this rugged new Cat D13000 Engine. Leading manufacturers of excavators, crushers, compressors and other heavy-duty machinery can furnish it in their equipment. Get the *complete* facts about it today from your nearby Caterpillar Dealer.

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D13000—A NEW STANDARD OF DIESEL POWER

Mining World

Including the Export Edition **WORLD MINING**

Published monthly except in April when publication is semi-monthly

Volume 16 — **OCTOBER 1954** — No. 11

MINING WORLD — Page

Drifts and Crosscuts 33
Capitol Concentrates 37
DMEA Program Proves Successful 57
Muriel Sibell Wolle describes Idaho Gold Camp 60
United States Personalities in the News 63
Index to Advertisers 96

WORLD MINING — Page

International Panorama 41
How Geophysics Discovered Pima Copper in Arizona 42
ALCOA's Expansion Assures Bauxite from Surinam 46
How Santa Fe Railroad Mines New Mexico Uranium 50
New Tax Law Will Save You Money by Granville S. Borden 54
Fission Facts 56
Newsmakers in International Mining 65
International News 67
Metal and Mineral Prices 70
Production Equipment Preview 80

COVER CIRCLE

The Anskania-Schmidt magnetometer shown in the cover circle played a vital role in the discovery of the Pima Mining Company's ore body. This is a story of how one firm employed geophysics to locate a deposit buried under 200-feet of alluvial wash.

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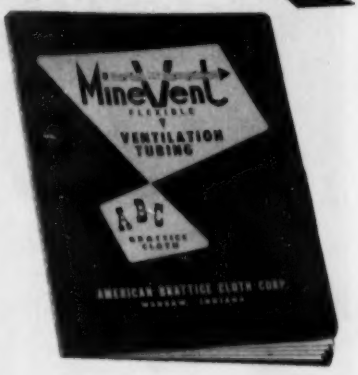
The Whole Story is Here for You!



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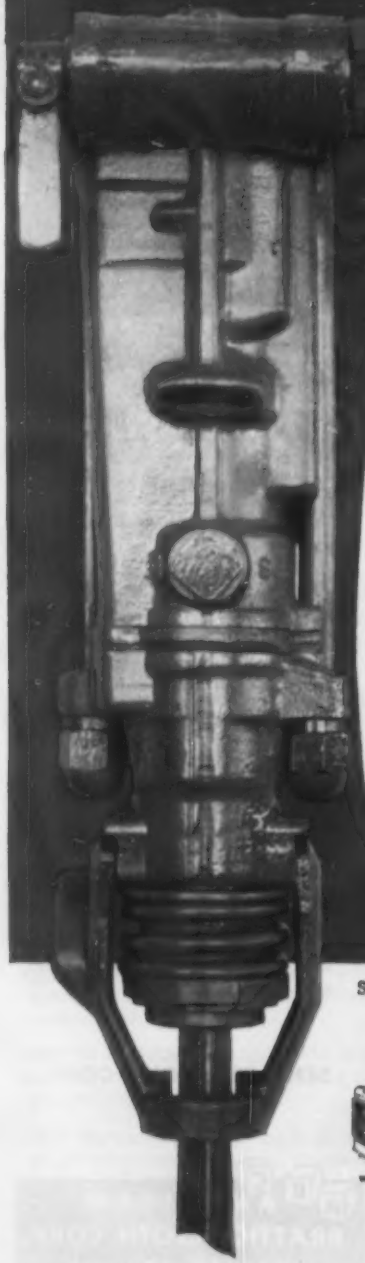


new! the medium-weight sinker that's quickly changed from wet to dry . . . to automatic wet.

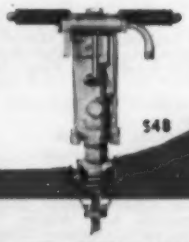
new! automatic valve for fast drilling . . . easy holding.

new! full swiveling water connection.

new! large-area water screen and self-cleaning air screen.

new! steel puller easily operated . . . simple to maintain.

The NEW MODEL S58 is a brother to the famous GARDNER-DENVER S48— the lightweight sinker that's already a favorite for fast, low-cost drilling.



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. . . through geological 'spade work' in the field—process development in the laboratory and plant . . . equipment improvization, no patterns to follow—design for mills with novel production problems—and engagement in scores of other metallurgical projects that demand scientific know-how and imagination.

The combined experience of this competent staff is yours to command. Either they have already solved a problem like yours or they will mobilize for action and come up with the practical and economical answer.

Write for details on an engineering service that has been profitably applied in major mining areas of the world.

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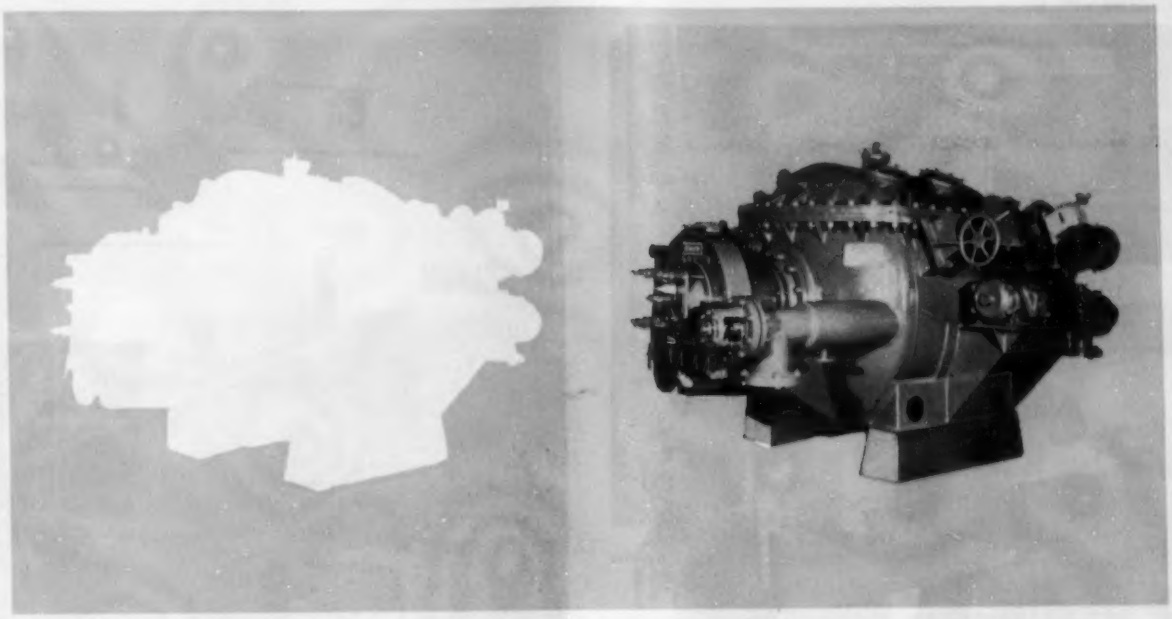

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When you have a place for a filter in your flow sheet and the function of this particular step is important, your purchasing should be done on the basis of performance and not price.

If you buy on the basis of performance, with specifications and design guaranteed to meet the performance, your first choice will be an Eimco.

If your work, however, can be satisfied with so many square feet of filter area and your first consideration is price, there are many able to supply your needs.

Eimcos are not cheap because they have built into them the heavy construction, the precision design and the unique know-how that comes with more than half a century of sucecssful experience.

Eimco will devote to your filtration problem, be it vacuum or pressure, the skill of its trained engineers in research, testing, design and construction. It will then guarantee successful results duplicating the test work necessary to prove your flow sheet.

Does your process need the best? If it does and you are willing to look beyond first cost, it will pay you to have Eimcos at the start.

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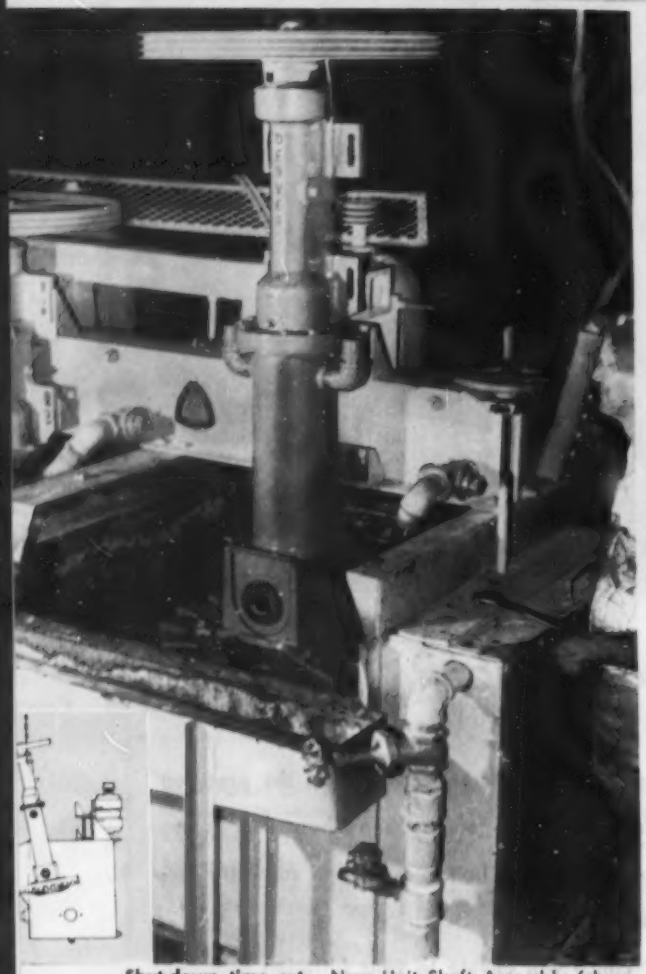
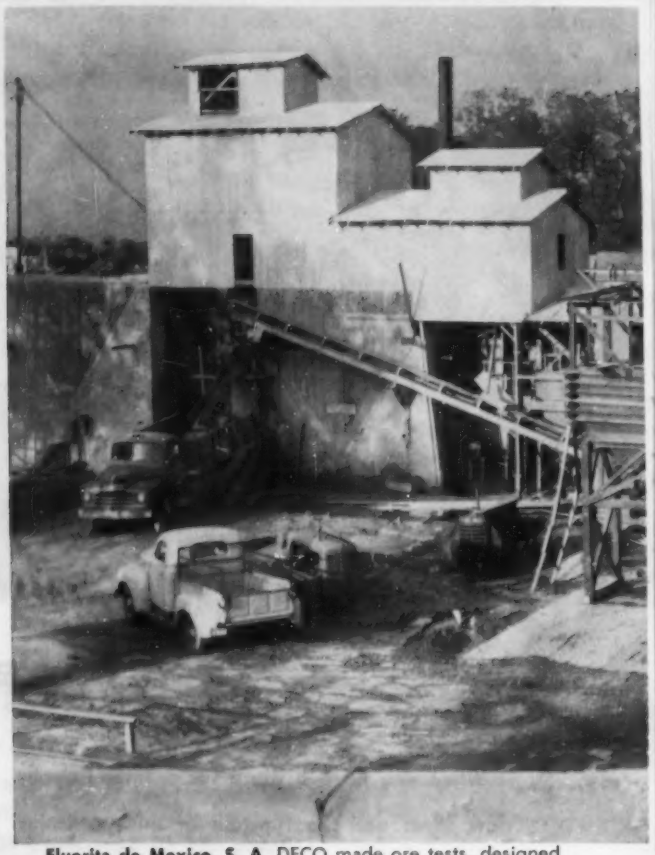
You Can't Beat An Eimco!

DENVER EQUIPMENT



Shut-down time cut — New Unit Shaft Assembly (above, being lifted out) on Denver "Sub-A" Flotation Machine cuts down-time to 10 minutes when replacing wearing parts. Only four easy-to-reach bolts on upper spindle bearing to remove and unit can be easily pulled out. It is applicable to all older machines because of DECO's standardization and policy of "no yearly models, but constant improving." Simplicity and standardization is our goal. Item No. 301.



Fluorita de Mexico, S. A. DECO made ore tests, designed flowsheet, made preliminary mill drawings and supplied equipment for this new fluorspar mill. DECO engineers are

Steel hood and apron, standard on all Denver Type H Crushers, protects heavy anti-friction bumper bearings. Denver Jaw Crushers to 32"x40" available for quick delivery. Item No. 303.

Thickener eliminated by 1½" Denver Vertical Pump's ability to handle frothy zinc concentrates without excessive spray water. Item No. 304.

Mr. Clarence Thom, Director of Denver Ore Testing Division: "We have helped operators around the world increase profits by checking mill results. May we help you?" Item No. 306.

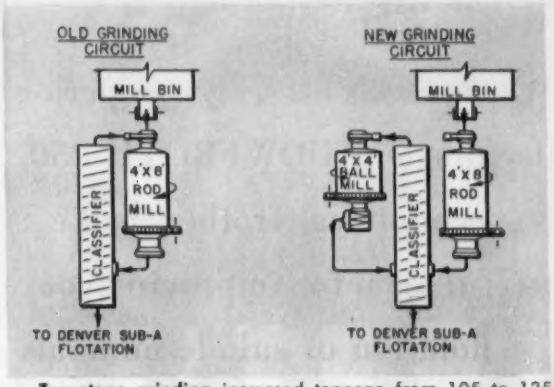
"The firm that makes its friends happier, healthier and wealthier"

DENVER EQUIPMENT CO. 1400 17th St., Denver 17, Colorado

IN THE NEWS . . .

daily helping mill operators increase production and recovery! Let us help you on your next flowsheet change. Write for the complete Fluorita story. Item No. 310.

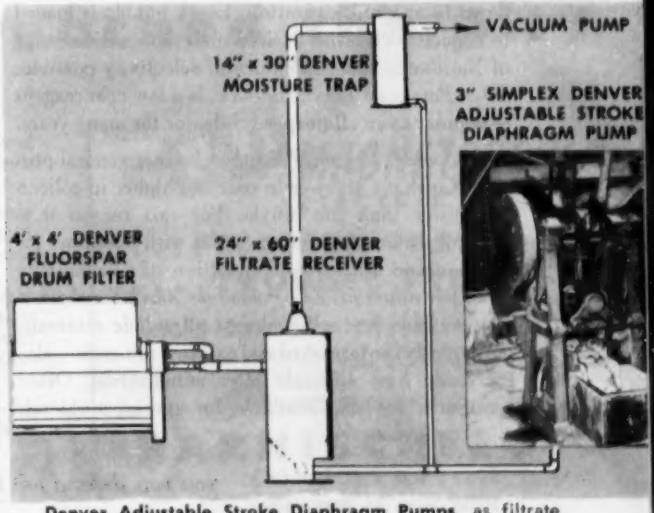
All-Steel Heads on all Denver Ball Mills put strength where it's needed. Item No. 308.



Two-stage grinding increased tonnage from 105 to 135 T/24 hrs. New DECO Flowsheet Study compares cost, H.P., savings, etc. on one- and two-stage systems. Item No. 302.

Flexibility of the Denver Disc Filter is utilized by mill operator to filter zinc on two discs and lead on one disc. Item No. 307.

New handy reference on Denver Tanks has just been published. This Denver Tank Bulletin includes specifications, price estimates, applications, and erection data. Item No. 305.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14" x 30" DENVER MOISTURE TRAP
3" SIMPLEX DENVER ADJUSTABLE STROKE DIAPHRAGM PUMP
4' x 4' DENVER FLUORSPAR DRUM FILTER
24" x 60" DENVER FILTRATE RECEIVER

Denver Adjustable Stroke Diaphragm Pumps, as filtrate pumps, eliminate air-locking and excessive pump wear due to dirty filtrates. Stroke and volume can be adjusted while pump operates. Item No. 309.

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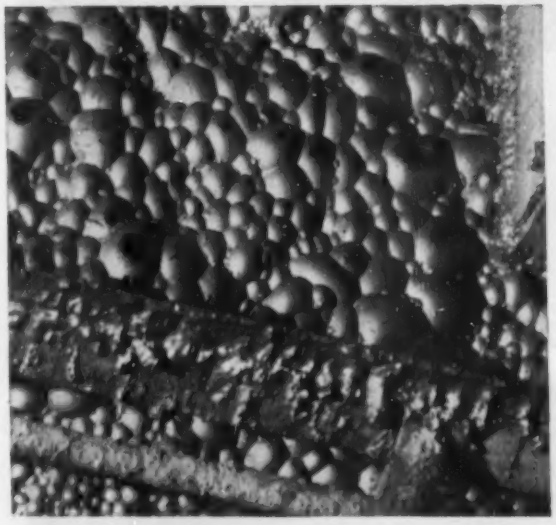

DOW XANTHATES bring mineral recovery up and costs down in any mill operation. Every bubble is loaded to capacity with the desired mineral—a wide range of Xanthates makes a choice of selectivity possible: Z®-3, *Potassium Ethyl Xanthate*, is a low-cost reagent—popular as an all-purpose collector for many years.

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DOWFROTH® 250 is an economical frother—producing improved metallurgy in many mills today, with as little as *one-fourth consumption of previous frothers used*. This translates into increased profits and substantial savings in all types of froth flotation operations.

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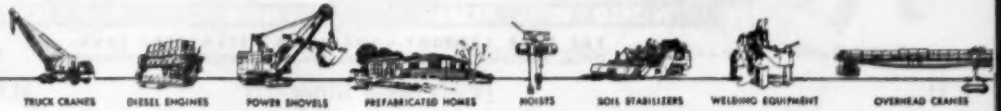

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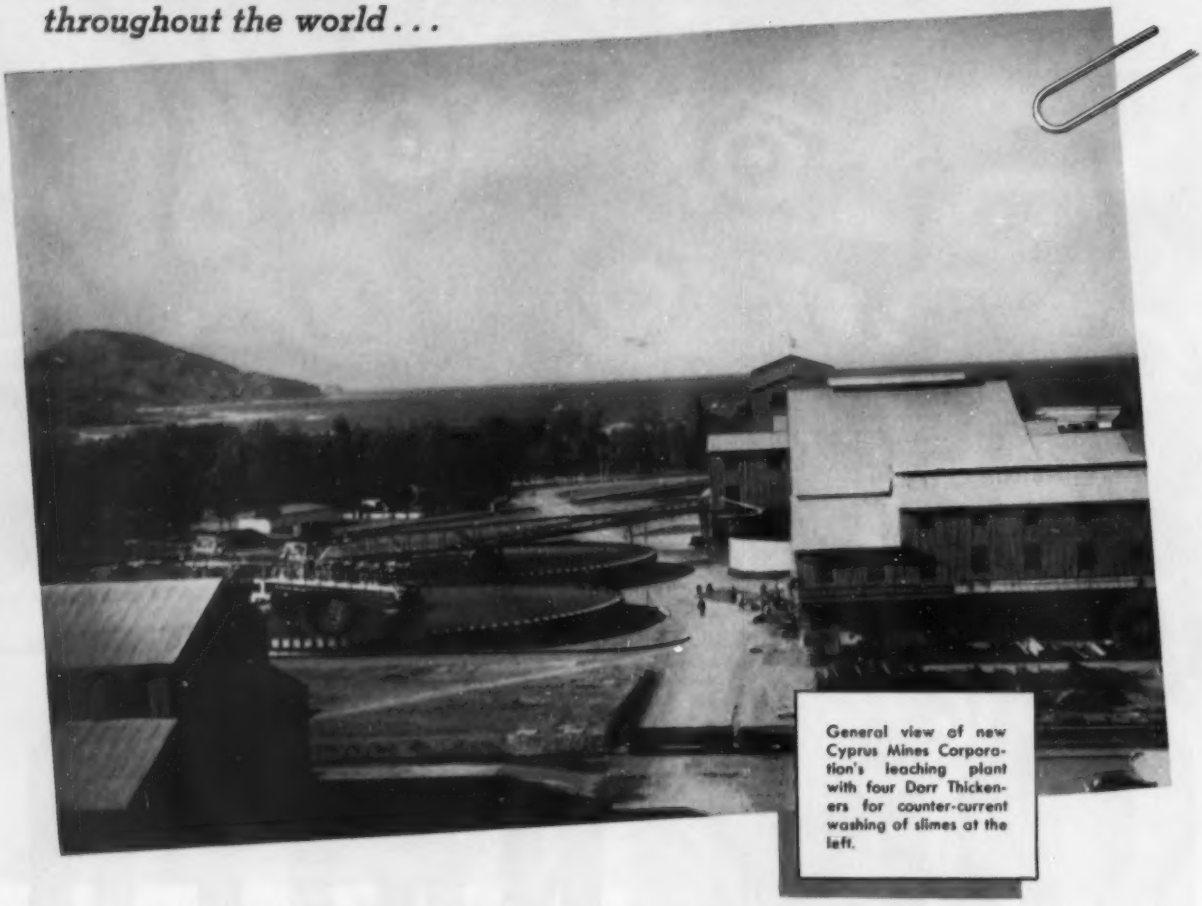

General view of new Cyprus Mines Corporation's leaching plant with four Dorr Thickeners for counter-current washing of slimes at the left.

Economically Extracting Additional Copper from Pyritic Ore in Cyprus

Cyprus Mines Corporation now recovers previously non-obtainable acid soluble copper by the addition of leaching to its existing flotation plant. Plant modifications involved separation of leached material into sand and slime portions and counter-current washing of both prior to flotation and iron cementation.

Dorr Research at the Westport Mill found the project practical . . . Dorr Consulting Engineering in the United States designed the complete plant. The Dorr Company, U. S. A. furnished the four Dorr Thickeners and four Dorr Classifiers required in the revised flowsheet. Dorr equipment installed in the initial flotation plant was supplied by our Associated Company, Dorr-Oliver, Ltd., London.

This is but one example of the flexibility of the Dorrco Worldwide engineering organization. Dorrco Worldwide experience can work for you too, through any of the following Associated Companies and Representatives, all with facilities for local manufacture.

In Europe: Dorr-Oliver Companies in England, Belgium, The Netherlands, France, Germany and Italy.

In South Africa: E. L. Bateman Limited, Johannesburg.

In India: Dorr-Oliver (India) Limited, Bombay.

In Australia: Hobart Duff Pty. Ltd., Melbourne.

In Japan: Sanki Engineering Co., Ltd., Tokyo.

In South America: Fiore Company in Buenos Aires; Serva Ribeiro in Rio de Janeiro and Sao Paulo; John Lindsay in Caracas; and conveniently located Dorr Resident Engineers.

DORRCO

Better tools TODAY to meet tomorrow's demand

DORR

FIFTY YEARS 1904-1954

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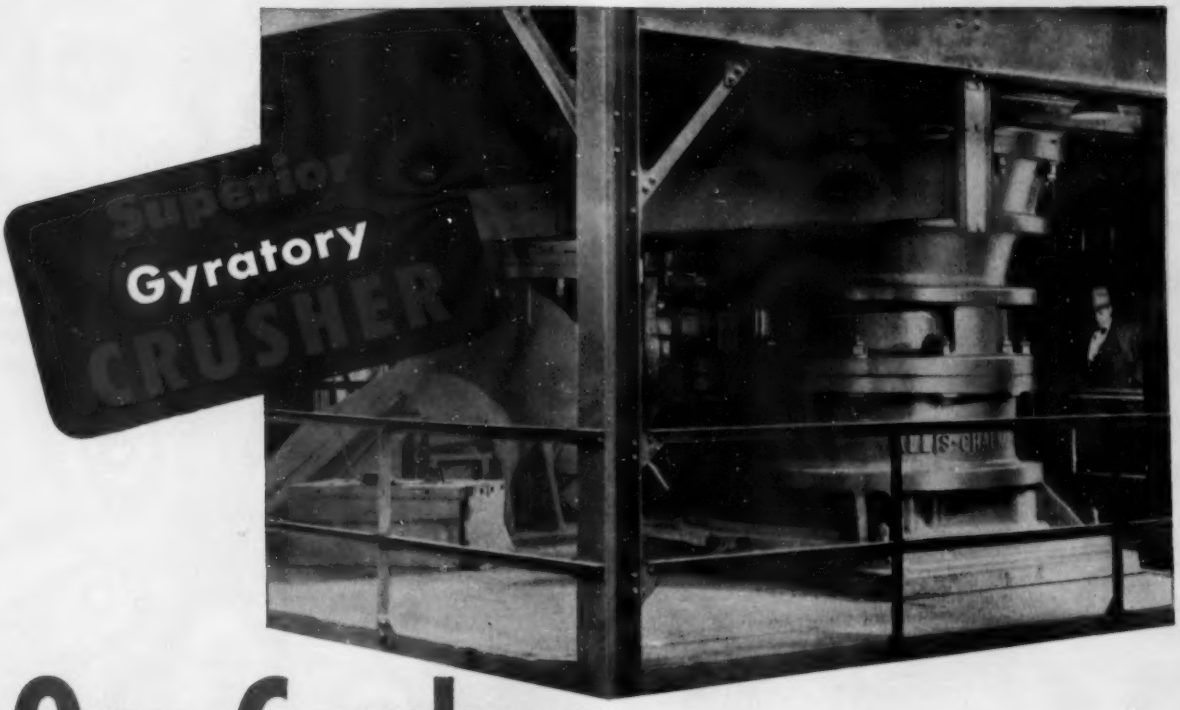
THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.

Offices, Associated Companies or Representatives in principal cities of the world.



One Crusher... Does Work of Two!

HOMESTAKE MINING Company installed a modern 30-55 *Superior* gyratory crusher to replace two old *Gates* gyratories. Despite the fact that the new crusher has a 30-inch feed opening, instead of a 17-inch opening as on the old crushers, it fits snugly into half the former space for two. The *Superior* can turn out much more tonnage than both old crushers. And it's built to surpass the 38-year service record of the old crushers.*

This increased capacity and improved performance is a direct result of over 70 years of experience in building crushers, years in which Allis-Chalmers leadership introduced many design advantages in gyratory crushers — the short mainshaft . . . improvements in the shape and size of the crushing chamber, in weight distribution, in dust protection and lubrication. These and other features mean more *profitable* crushing for you, when you specify Allis-Chalmers!

A-4195

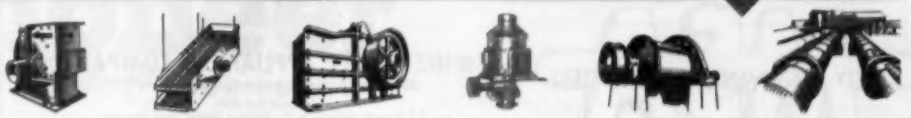
For more facts on *Superior* primary or secondary crushers, call the Allis-Chalmers representative in your area or write Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 07B7870.

**Yes, the old Gates crushers were built by Allis-Chalmers too — back in 1913!*

Superior and Gates are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.



Hammermills | Vibrating Screens | Jaw Crushers | Gyratory Crushers | Grinding Mills | Kilns, Coolers, Dryers

He helped light the way to Safety

FOR MINERS EVERYWHERE

This month, the nation marks the 75th anniversary of Thomas A. Edison's invention of the first practical incandescent lamp. Giving added luster to this celebration is another of his great inventions . . . the first safe cap lamp for miners. Because his lamp eliminated the principal cause of mine fires and explosions—the open flame lamp—Edison called it his "most humanitarian invention."

M.S.A. has been world distributor of Edison Lamps since their introduction in 1915. Working with Edison Laboratories ever since, M.S.A. has continued to improve efficiency and construction. The cumulative result of this combined activity is the present Edison R-4—100 times brighter than the first Edison lamp. The R-4's contribution to underground safety and production is written in the records of its many users.

MSA
SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service . . . our job is to help you

MINE SAFETY APPLIANCES COMPANY
201 North Braddock Avenue, Pittsburgh 8, Pa.
At Your Service:
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MINE SAFETY APPLIANCES CO. OF CANADA, LTD.
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SERVING SAFETY
40
YEARS
1914 • 1954

Why brute loads don't "bust" this screen

● Here's a screen built to take abuse . . . a screen specifically designed to handle large quantities of *big, heavy* rock and ore.

The main frame of this powerful PIONEER Mesabi Vibrating Screen is built from 18" car channel or I-beams and reinforced with 8" wide flange cross beams. Screen frames are constructed from extra-heavy channels, pipe, angles, and bars. Pan side thicknesses range from ¾" to ½", depending on size of screen. Angle bracing at critical points adds further strength and rigidity. Beefed-up shafts are built to take it.

EFFICIENCY. PIONEER Mesabi screens are not only rugged, but you just can't beat them for fast, accurate separation.

That's because PIONEER's full circle, forward throw agitation produces an identical, positive motion from one end of the pan to the other. Every inch of this screen works for you.

Near-perfect balance is maintained by placing the shaft at the pan's exact gravitational center and counterbalancing the flywheels to offset the throw of the pan. This gives precise end-for-end, top-for-bottom balance at all times. Since vibration is confined to the pan and not transmitted to the frame, less power is needed and equipment lasts longer.

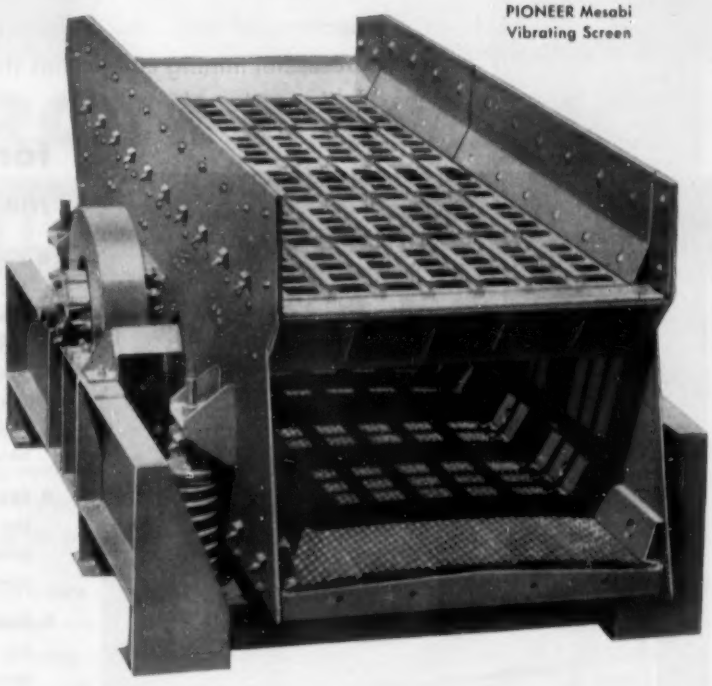
OUTPUT. PIONEER screens are known for their extra capacity. Positive throw, down-hill agitation, and use of the entire screen surface, combine to deliver maximum tonnage.

SPECIFICATIONS

Size	Horse-power	Approximate weight in pounds		
		1 Deck Scalping	2 Deck Scalping	2-Deck Gradation
4'x10'	15	8,900	8,800	8,000
4'x12'	15	10,000	10,000	9,100
5'x10'	20	11,800	11,800	11,000
5'x12'	20	12,800	12,700	12,000
5'x14'	25	13,700	13,600	13,000
6'x12'	30	14,550	14,200	13,800
6'x14'	30	15,800	15,300	14,900

Ask your screen salesman these questions

1. Will frame resist sagging and twisting under heavy loads?
2. Is vibration effectively confined to pan?
3. Do both ends of screen vibrate equally with the middle?
4. How efficient, percentagewise, is separation?



PIONEER Mesabi Vibrating Screen

For detailed features, specifications, and performance data, write Pioneer Engineering Works, Inc., Minneapolis 13, Minnesota, or see your nearest PIONEER Distributor.

BUY BOTH! HIGHER OUTPUT LOWER UPKEEP

Pioneer *Continuflo* EQUIPMENT

Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.
Subsidiary of Poor & Company • Chicago
Please send information on equipment checked.

- ☐ GRAVEL PLANTS
- ☐ WASHING PLANTS
- ☐ MECHANICAL FEEDERS
- ☐ ROCK PLANTS
- ☐ BITUMINOUS PLANTS
- ☐ VIBRATING SCREENS
- ☐ JAW CRUSHERS
- ☐ APRON FEEDERS
- ☐ BUZZER SCREENS (LIGHT DUTY)
- ☐ ROLL CRUSHERS
- ☐ ORE FEEDERS
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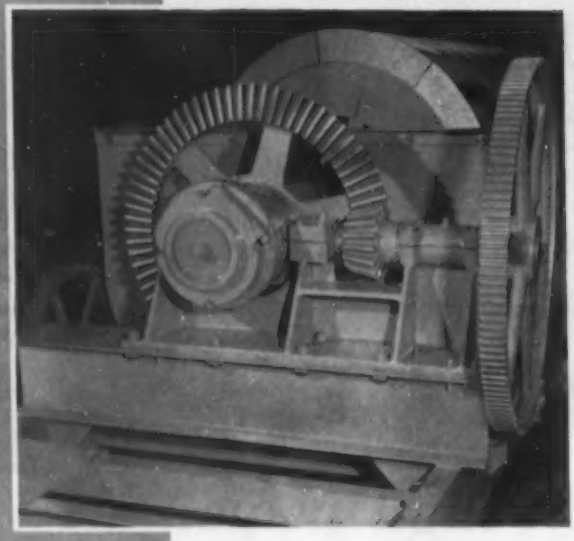
how

AKINS

leadership in mechanical performance can help you cut costs

Classifiers and heavy media separators are selected on the basis of low-cost-per-ton output resulting from efficient, dependable mechanical and metallurgical performance. That's why so many successful mining companies throughout the world continue to order *and reorder* Akins.



for example...

the gears

- **Meehanite metal gears**
  the bevel gear and spur gear are made of Meehanite metal. With Meehanite it is possible to obtain definite pre-determined and uniform properties to best meet the requirements of each application. Its uniform density, high tensile strength, and fatigue strength provide special qualities of toughness and resilience.
- **faced bevel gear and bevel pinion**
  the Meehanite bevel gear and cast steel bevel pinion have faced teeth...they run smoother and quieter, last longer.
- these features, like the patented submerged bearing and rugged main shaft, result in more efficient operation—thus, low-cost-per-ton production.

WRITE FOR CATALOG

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AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

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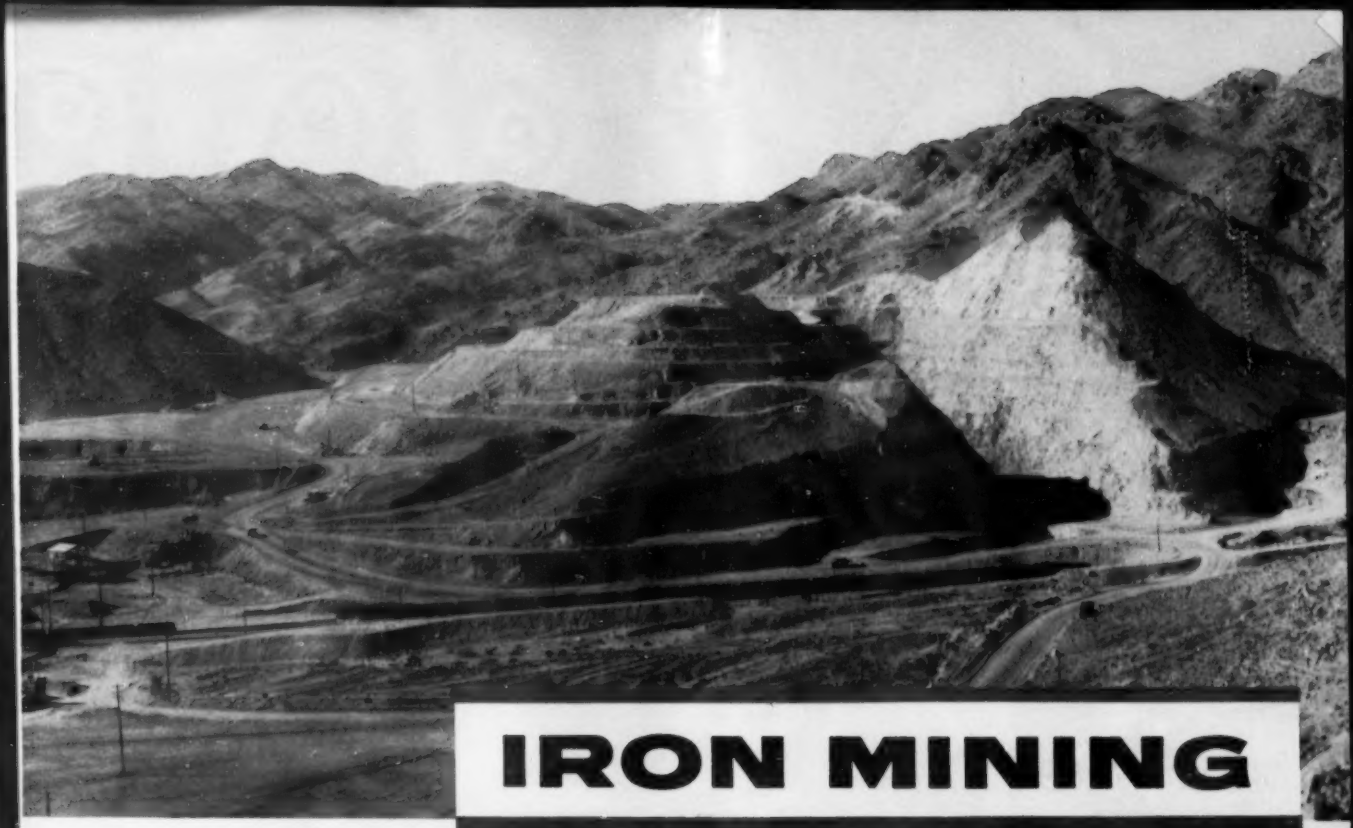


General view of Kaiser Iron Mine at Eagle Mountain, California.

IRON MINING
In California

22 ton "Euc" with quarry body being loaded by 5 cu. yd. shovel.

Dumping 22 tons of ore into crusher for processing and rail shipment to Fontana Plant of Kaiser Steel Corporation.

Kaiser Steel Uses "Eucs"

IRON ORE for the big Kaiser Steel plant at Fontana, California, comes from an open pit mine in the Eagle Mountains between Indio and Blythe. Mining operations began in July of 1948 with 11 Rear-Dump "Eucs" of 15-ton capacity removing overburden, stockpiling low grade material and hauling top grade ore from loading shovels to the main crusher.

Performance of the original Euclid fleet was so dependable and efficient that Kaiser now uses 15 "Eucs" of 22-ton capacity with 5 of the 15-ton units. Loading shovels have 4½ and 5 cu. yd. buckets . . . hauls from bench to crusher have long grades of minus 8%. Despite big loads and steep downhill hauls, speed is controlled without excessive use of the service brakes by means of retarding units that maintain maximum safe travel speeds at all times.

If you have a problem of moving large tonnages on tough off-the-highway hauls, ask your nearby Euclid distributor for helpful facts and figures. He may be able to help you reduce costs, and besides, he's a good man to know!

Cable Yuklid —Code Bentley

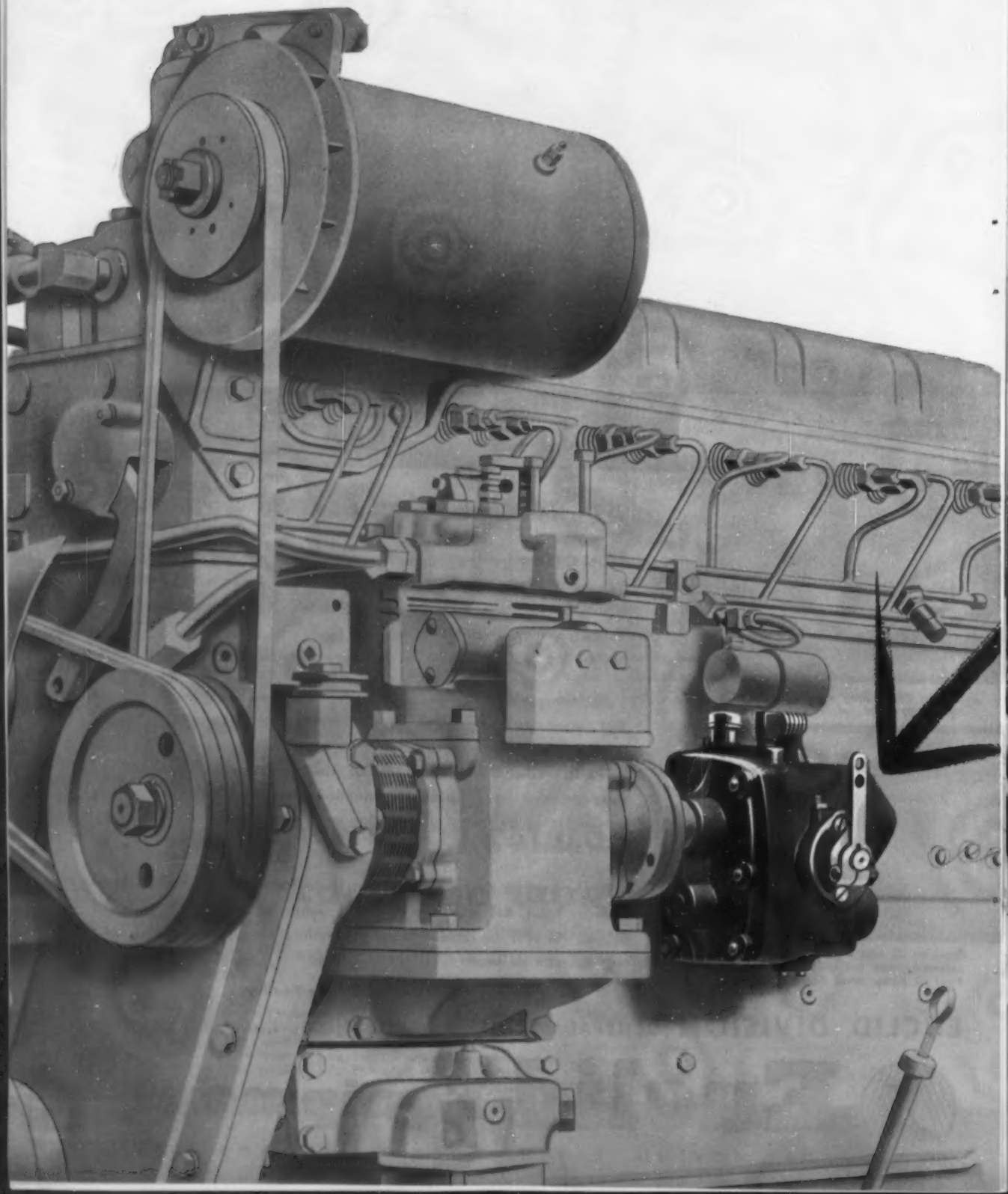
EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

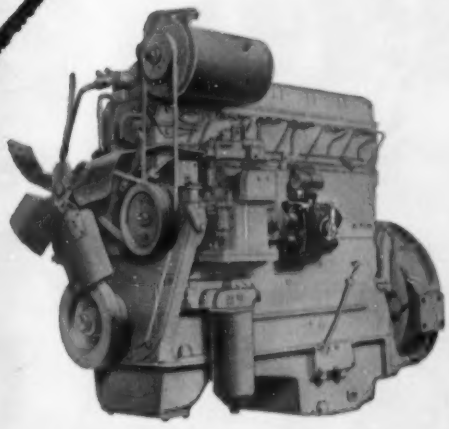
FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

Cummins new, exclusive diesel



fuel system needs no specialists!



PT Fuel System standard on all models...simpler to work with than gasoline carburetion and ignition

- Fuel system servicing costs become negligible.
- Compact pump weighs only 13 pounds—system has no fuel racks to adjust . . . no check valves, metering plungers, discs or floats—pump not timed to engine.
- Fewer parts than any fuel system on any heavy-duty engine.
- Adaptable to all Cummins Diesels built since 1932.

Write for your copy of descriptive folder "Cummins PT Fuel System."

CUMMINS

Leader in rugged, lightweight, high-speed diesels (60-600 h.p.)

SAN FRANCISCO
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Branches: FRESNO; REDDING. *Authorized Sales & Service:* STOCKTON—Stockton Fuel Pump & Injector Service; SACRAMENTO—Frank J. Coyle; EUREKA—Fred E. Sarnett; RENO—Nevada Transit Company.

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Branch: BAKERSFIELD. *Authorized Sales & Service:* BISHOP—Inyo Diesel Service; BLYTHE—Leo's Diesel Service; COLTON—Smith's Diesel Sales; EL CENTRO—Rhyne's Automotive Service; SAN LUIS OBISPO—San Luis Truck Service; SAN DIEGO—E. W. Equipment Company; SANTA MARIA—Hanson Equipment Co.; BAKER—Newton Automotive Service; LAS VEGAS—Stirling Diesel Service.

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(5-10-54)

FOR MEN WITH AN EYE ON THE FUTURE

MARION 191-M *10 cu. yds.*

THE WORLD'S LARGEST LOADING SHOVEL

Men of vision in many industries thrill to the potentials of this machine, the world's biggest shovel on two crawlers.

New in this decade, the MARION 191-M pushes aside mechanical limitations of the past and gets BIGGER jobs done BETTER as well as FASTER.

It has the cycle time, maneuverability and travel speed of small machines, and is the ideal working companion of the world's largest haulage units.

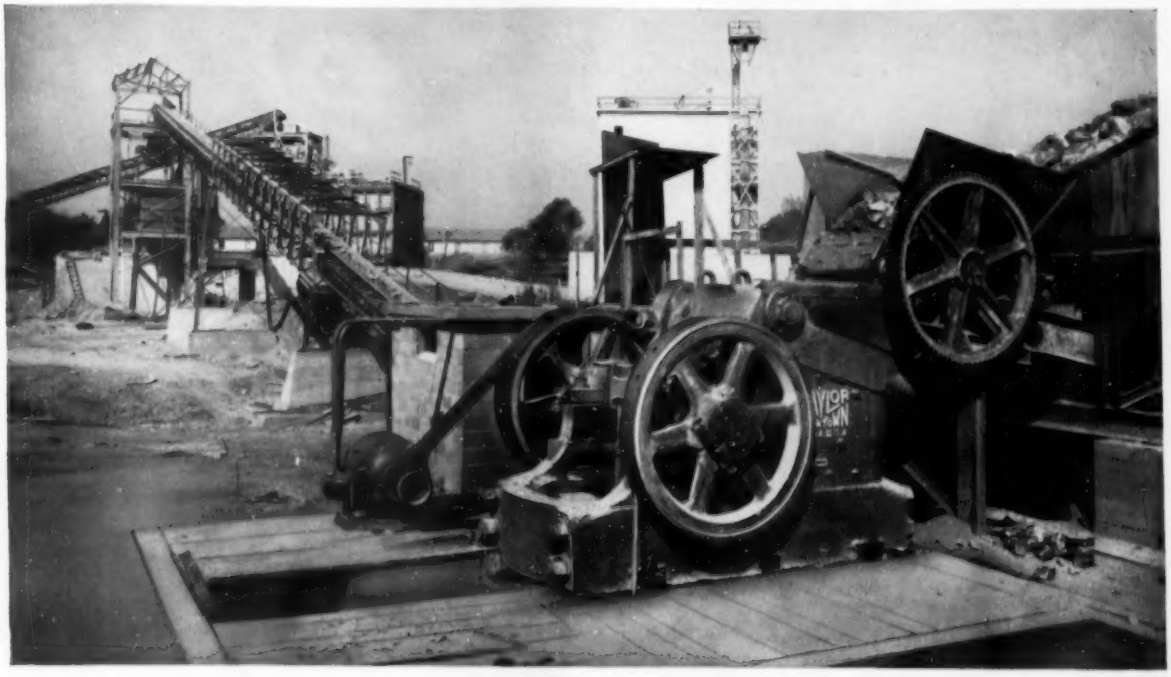
The resourcefulness, skill and experience that developed the MARION 191-M are qualities that make MARION the preferred excavating machines in all sizes from 1 to 60 cubic yards.

MARION POWER SHOVEL CO.
Marion, Ohio, U. S. A.
from 1 cu. yd. to 60 cu. yds.

OSGOOD-GENERAL, a subsidiary, manufactures excavators in sizes from ¼ to 2½ cubic yards, truck cranes from 15 to 25 tons, Mobilcranes from 25 to 45 tons and log loaders.

it's not what you put into a Traylor "R" Crusher that counts ...it's what you get out that

pays off



TRAYLOR ENGINEERING & MANUFACTURING CO.
693 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

I'd like to know more about the Traylor Type "R" Crusher and its pay-off in increased production.

Name _____

Company _____

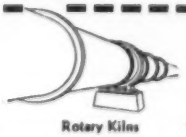
Address _____

I am crushing _____ *tons per hour with a* _____ *crusher.*

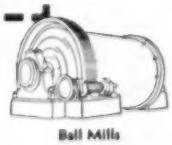
a **Traylor** *leads to greater profits*

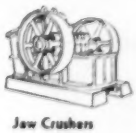
Today, the initial cost of a machine is not the deciding factor in its installation. Production potential is the prime consideration. A Type "R" Jaw Crusher is "Traylor-Made" to make money for its operator. With feed openings from 36" x 48" to 48" x 60", a Type "R" Traylor Crusher can produce 130 to 550 tons per hour of 2" to 9" product. The main reason for the Type "R's" amazingly high rate of production is its original Traylor Curved Jaw Plates. The several ways in which Traylor curved jaw plates lower production costs are clearly described in Bulletin 1123. Mail coupon for your copy today.

Primary Gyratory Crushers


Rotary Kilns

Secondary Gyratory Crushers


Ball Mills


Jaw Crushers

Apron Feeders

Deep in Chile's Santiago Valley is an excellent example of how rudimentary methods and equipment can achieve low cost-plus-tails . . . with the right reagents. 1

The flow scheme is this simple: Ore running 2% copper carried to the surface (photo 1) is crushed to minus two inches (photo 2) and spread in layers on the mill floor. Over each layer several soup cans of Cyanamid AEROFLOAT® 31 Promoter and AERO* Xanthate 301 are ladled and a dash of pine oil added. Then the batch is spaded and sliced (much as you hand-mix concrete) and shoveled into the Trapiche (photo 3). By adjusting the weir on the trough in which the steel-shod concrete wheels rotate and varying the pulp density, flotation feed overflows at minus 48 mesh to a battery of four roughers and two cleaners (photo 4). 2

At the head of the circuit a booster shot of AERO Xanthate 301 drip feeds through a nail hole in a can, while Sodium Sulfide is added to the last two roughers to float oxide ore. A three-man crew mills 10-12 tons a day. Though control assays are few and far between, smelter returns show a surprisingly high profit. 3

Small or Large... Cyanamid helps

Seven hundred miles north and 8,000 feet higher in the Andes is the mill pictured on the opposite page. It treats upwards of 20,000 tons per day of copper ore assaying substantially the same as the feed to the primitive 10-ton mill above. Though its methods and equipment are ultra modern, for maximum recovery it also uses an efficient reagent combination . . . Cyanamid AEROFLOAT 238 and Isopropyl Xanthate. 4

* Trade Mark

AMERICAN *Cyanamid* COMPANY

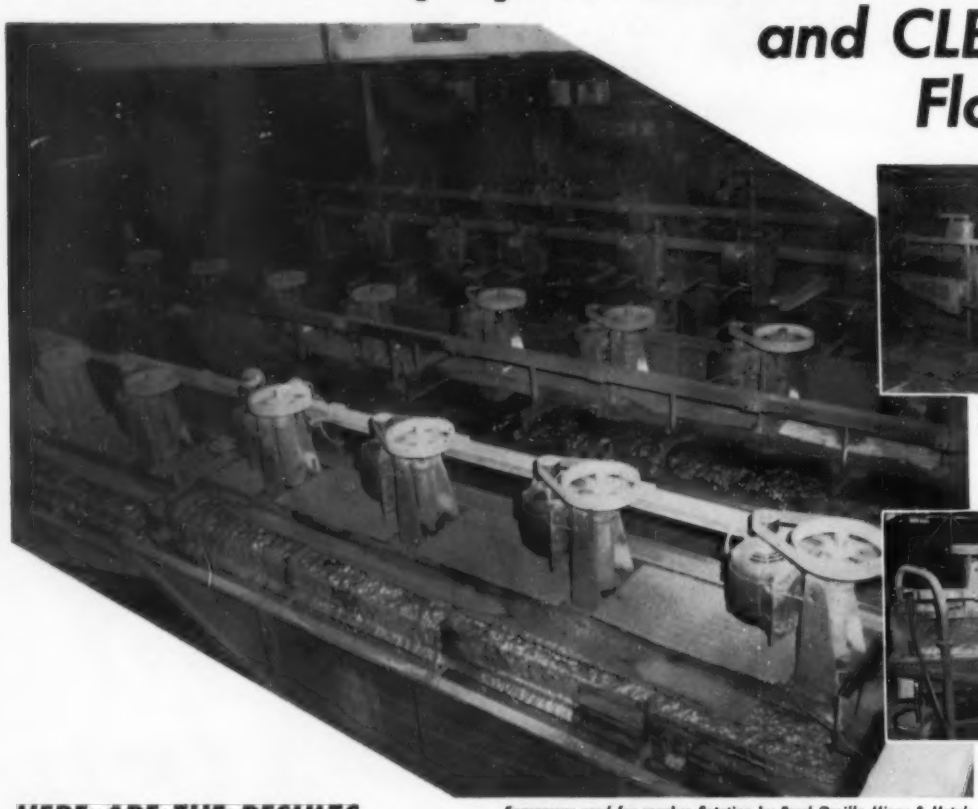
mills select the right reagents

At each of these mills a Cyanamid Field Engineer spent many, many hours helping to work out the best reagent set-up for the operating conditions. Whether your mill is large or small, a Cyanamid Field Engineer may be able to help you develop a better reagent combination for your ore on your mill.

Cyanamid offers a most complete line of flotation and cyanidation chemicals plus efficient processes for separation by specific-gravity differences. A nearby Cyanamid Field Engineer will welcome the opportunity to work with you to cut costs, increase recoveries or both.

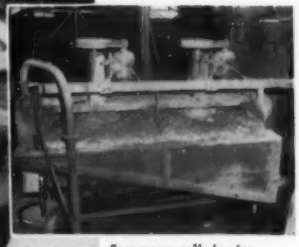
MINERAL DRESSING DEPARTMENT 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

FAGERGRENS *pay off in both ROUGHER and CLEANER Flotation*



Fagergrens used for rougher flotation by Pend Oreille Mines & Metals Co., Metalline Falls, Wash. Zinc circuit in foreground, lead circuit in center; duplicate circuits being installed in background.

Fagergren cells in lead cleaner flotation circuit.



Fagergren cells in zinc cleaner flotation circuit.

HERE ARE THE RESULTS OBTAINED BY A MAJOR LEAD-ZINC PRODUCER

48 Fagergren Flotation Machines are used by Pend Oreille Mines & Metals Co. in flotation circuits having a capacity of 1600 tons per day. The ore is hard and abrasive with lead (as galena) occurring in coarse crystals and zinc (as sphalerite) finely disseminated in the gangue. Specific gravity of ore is 2.7 to 2.8.

Fagergren's highly efficient performance in this application produces superior metallurgical results, as follows:

1. Lead concentrate grade averaging well over 70% lead.
2. Zinc concentrate grade running close to 60% zinc.
3. Recoveries of approximately 95% lead and zinc in respective concentrates.
4. Exceptionally low lead and zinc tailing assays.

High Metallurgical Efficiency, as demonstrated above, is not unusual with Fagergrens. It is based on the faster rate of flotation and greater flotation recovery made possible by Fagergren's exclusive Rotor-Stator design. This superior agitating mechanism is unmatched for effective pulp circulation and aeration with resulting greater capacity per cubic foot of cell volume and higher mineral recovery.

Specify Fagergrens for your next installation or as replacements for older, less efficient machines. Send today for free copy of Fagergren descriptive bulletin and for recommendations concerning your flotation problem.

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The Engineer's Report

CASE HISTORY

PRODUCT *RPM Delo Oils*

FIRM *Bagdad Copper Corp., Bagdad, Arizona*

Biggest truck in the world uses RPM DELO Oil!

246,000 POUNDS TOTAL LOAD, 48 tons of truck and 75 tons load, are hauled out of the Bagdad Copper Corp.'s ore pit at Bagdad, Arizona, by the two 350 h.p. supercharged diesels in this unit. RPM DELO Special Lubricating Oil is used in the engines as specified by Mr. Ernest Dickie, General Manager of Bagdad, on the basis of his years of experience with RPM DELO Oils in many other heavy-duty engines.

The big truck, described as the largest in the world, was designed by Mr. Dickie and engineers of Dart Truck Co., builders. Power is transmitted through 3-stage torque converters. All controls are powered.

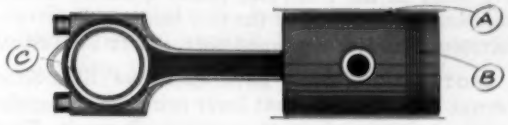
FREE FOLDER tells you about all the RPM DELO Oils and how they meet every heavy-duty engine condition. Write or call for it today.

FOR MORE INFORMATION about petroleum products of any kind or the name of your nearest distributor, write or call any of the companies listed below.

RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" REG. U. S. PAT. OFF

How RPM DELO Oils reduce wear, corrosion, oxidation in all heavy-duty engines



A. Contain special additives that provide metal-adhesion qualities...protect parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring sticking. Detergent keeps parts clean...helps prevent piston scuffing.

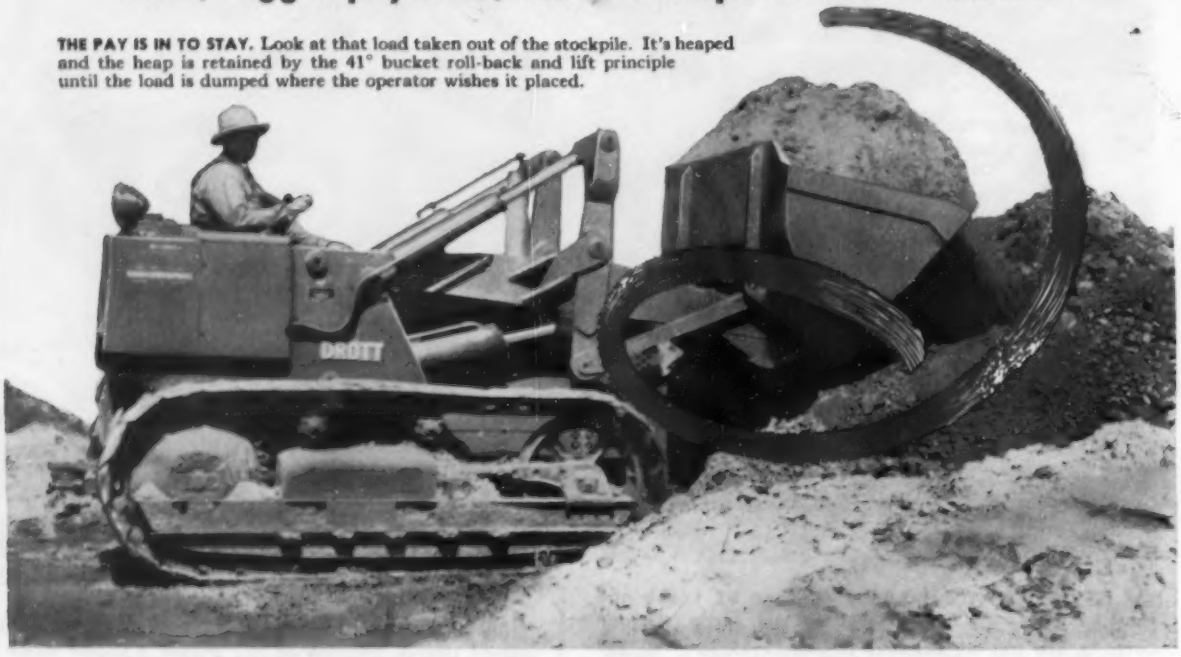
C. Special compounds stop corrosion of any bearing metal and foaming in crankcase.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

Get a LOAD of This!

Exclusive DROTT Skid-Shoes are the big reason why INTERNATIONAL crawlers with DROTT Skid-Shovels deliver 300% greater digging force, bigger payloads, faster transport than all others!

THE PAY IS IN TO STAY. Look at that load taken out of the stockpile. It's heaped and the heap is retained by the 41° bucket roll-back and lift principle until the load is dumped where the operator wishes it placed.



Big news in the front-end loader industry today is the amazing performance of the new leader in loaders—INTERNATIONAL crawler equipped with DROTT Skid-Shovels.

DROTT Skid-Shovels have exclusive Skid-Shoes that permit use of the ancient lever principle to supply 300% greater break-out force than all other shovels. These same Skid-Shoes transmit loading force into the ground and let the units transport heaped loads at ground level in third gear—not first—to speed every loading cycle and eliminate carrying strain.

The Hydro-Spring is still another DROTT exclusive—absorbing 70% of the shocks normally encountered in front-end loaders to extend equipment life and make operating far easier.

Skid-Shovels come in four sizes—⅜, 1¼, 2 and 3 cu. yd. buckets for the INTERNATIONAL TD-6, TD-9, TD-14A and TD-18A. You can get an eye-opening demonstration of the model suited to your needs by simply calling your INTERNATIONAL Industrial Power Distributor today.

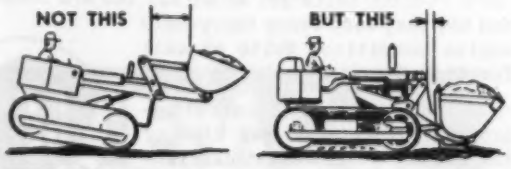
INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS
DROTT MANUFACTURING CORP., MILWAUKEE 8, WISCONSIN

PRY-ACTION BREAK-OUT

3,000 to 9,000 lbs. all on front of tractor

9,000 to 27,000 lbs. all on loader shoes on ground

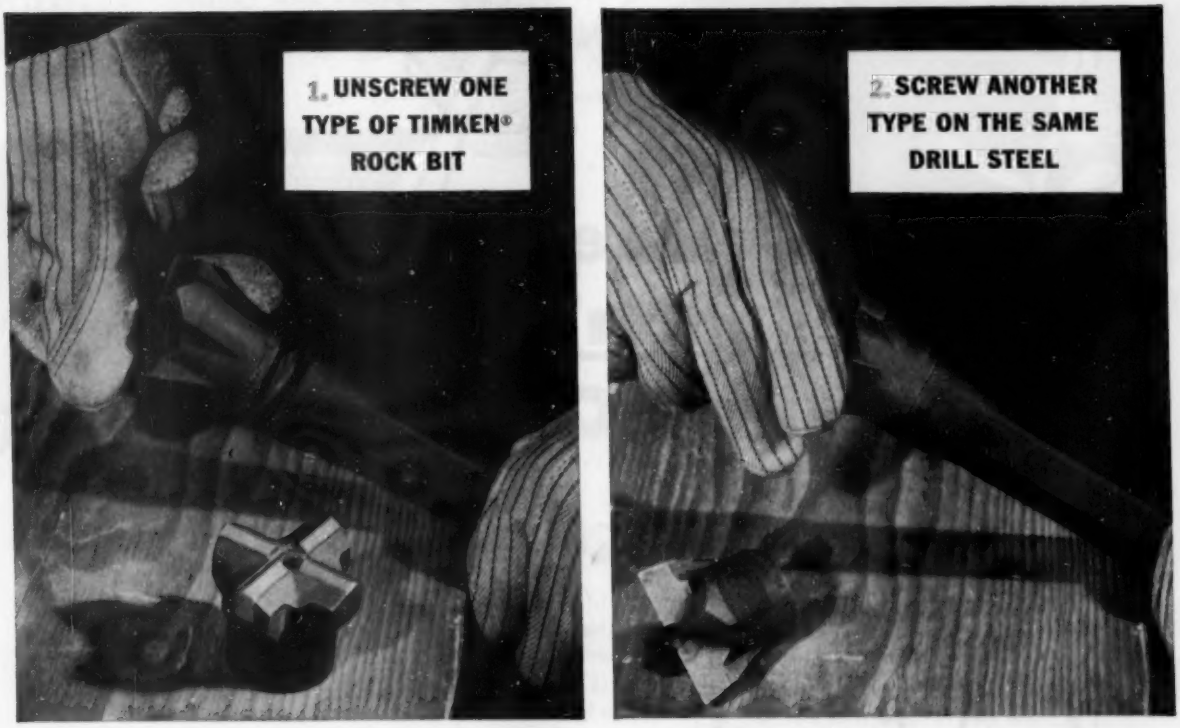
SKID-SHOE TRANSPORTATION



INTERNATIONAL HARVESTER

INTERNATIONAL DROTT

HOW TO SWITCH ROCK BIT TYPES WITHOUT LOSING TIME



TIMKEN® carbide insert and multi-use bits are interchangeable on the same drill steel!

DRILLING time goes to waste every time drillers have to change steels to accommodate different types of rock bits. But with Timken® multi-use and carbide insert bits, this costly delay is eliminated. Dozens of them fit the same threaded drill steel. All the driller has to do is unscrew one type and screw on another. No need to change steel, no need for the driller to leave the job.

That's the way to get the most benefit from switch-bit drilling—switching bit types as the ground changes. You save drillers' time and there's no necessity of stocking large inventories of drill steels.

All Timken multi-use and carbide insert bits are manufactured from electric furnace Timken fine alloy steel. Their special shoulder unions keep drilling impact from damaging the threads.

Our rock bit engineers will be glad to help you with your drilling problems through careful analysis of your operations. They're recognized as experts in reducing drilling costs, so call on them now. There's no obligation. Just write to The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken Multi-Use Rock Bit

Timken Carbide Insert Rock Bit

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

your best bet for the best bit .. for every job

This simple idea saves money in V-Belt Costs

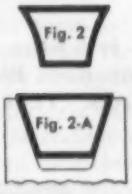
You can prove it in two minutes!

To prove how the CONCAVE SIDES of GATES VULCO ROPES *save money*, just make this simple test—

Bend *any* V-Belt that has *straight sides* (Fig. 1) and—as the belt bends—*feel* the sides *bulge out* (Fig. 1-A). This out-bulge concentrates the wear at the points shown by arrows—and this naturally shortens the life of a *straight-sided* belt!

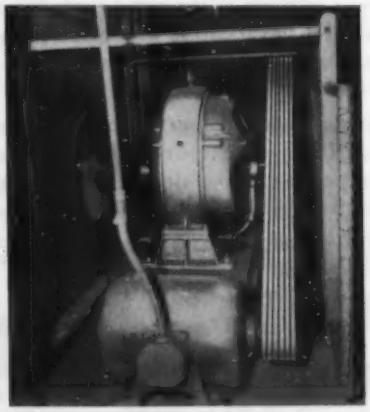
Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

(U. S. PAT. 1813698)



You find that the CONCAVE SIDES *fill out* and become perfectly straight. They thus press *evenly* against the V-pulley. All wear is distributed *uniformly* across the *full width* of the GATES VULCO ROPE—and this means *longer* belt *life* and *lower* belt *cost* for you!

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the GATES VULCO ROPE!



Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

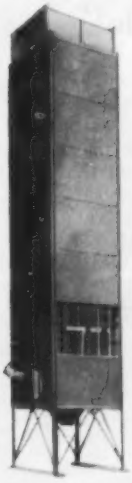
VULCO ROPE DRIVES

THE GATES RUBBER COMPANY
DENVER, U.S.A.

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

CS-549

New *simplicity and sustained efficiency in dust filtering and collection . . .*



Dualaire*

REVERSE-JET DUST COLLECTOR

Efficiencies up to 99.99%

Cloth filter systems of one design or another have long been used by industry for cleaning industrial gases and/or recovering dust or other suspensions. But three problems are common to such systems... (1) Extreme changes in pressure drop and filtering efficiency as dust cakes accumulate on the filter surface... (2) Wide pressure fluctuations and surges in the plant system as filter units become clogged or are cut out and rapped for cleaning... and (3) Rapid deterioration of the filter material by the vibration, shaking and rapping equipment used for cleaning.

But now the DUALAIRE Collector—as engineered by Western Precipitation, pioneers in the field of dust recovery—provides the answer to these and other problems common to conventional bag-house equipment.

The Dualaire Principle is Simple, Efficient. **Basically, each Dualaire filter unit consists of a cloth or felt tube, open at both the top and bottom. (A) Dust-laden gases enter at top of the tube and are filtered as they pass through the side walls of the tube to the exhaust system. (B) Dust particles collect on the inside of the tube and before the cake builds up sufficiently to affect filter operation, a tubular blow ring (C) automatically starts moving up and down the outside of the filter cylinder. A jet of air, concentrated by this blow ring, reverses the normal gas flow at the point contacted by the ring, thus jetting the dust layer off of the inner surface of the filter tube.**

This jetting action is further assisted by a flexing of the filter cylinder as the blow ring passes, thus cracking and loosening the dust layer from the inner surface, from where it drops to the recovery chamber below the bottom of the tube.

The entire operation is positive and simple. The blow ring starts its action *automatically* as soon as the dust layer causes a pre-determined pressure differential. And after the filter surface is cleaned, the blow ring *automatically* stops.

6 ADVANTAGES OF DUALAIRE DESIGN...

PRESSURE DROP remains uniformly low at all times because the dust is removed continuously in *small portions.*

FILTERING EFFICIENCY remains uniformly high at all times without the "choking" action characteristic of conventional bag-houses. Actual field tests show efficiencies as high as 99.99%!

DUST RECOVERY is in steady increments—not in sudden large "batches" as with conventional rapping systems. Thus the Dualaire eliminates surges and detrimental variations in the plant system.

FILTER ELEMENT has a much longer life because it is not subjected to the stresses of rapping or jarring while being cleaned. Dualaire reverse-jet cleaning action is gentle, yet far more effective.

GREAT SAVINGS are also made in space and the size of installation required. Because each Dualaire filter unit is cleaned more-or-less constantly without shut-down, there is no need for costly standby units—or the complicated switching equipment to cut standby equipment in and out.

BASIC UNITS are "sectionalized" and are available in 5 standard heights. Sections can be bolted together in any desired multiple, providing a capacity range to fit virtually any requirement. As needs increase, add more sections.

There are many other advantages built into the DUALAIRE. *For further details send for this descriptive 12 page booklet. Or contact your nearest Western Precipitation representative!*

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DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

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PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

* ® "Dualaire" & "Multiclone" Licensed by H. J. Hersey, Jr.

"Look what rib-pinching does to our shuttle car cable!"

"Sometimes the cable gets cut almost in half. And that's dangerous to the men. So we have to shut the machine down to make a splice. That costs money. Run-overs, rock splinters and sharp corners between the face and the main tunnel are tough on the cable! How can we make our cable last longer under these conditions?"

"Well, a few simple things can help you double cable life."

"First, careful handling is most important at all times. Another thing, avoid run-overs. A broken sheave or guide is a gamble. Don't pinch the cable on the roof, rib or bottom . . . and don't buy cable on price alone. *One break can cost you more than you can possibly save!*"

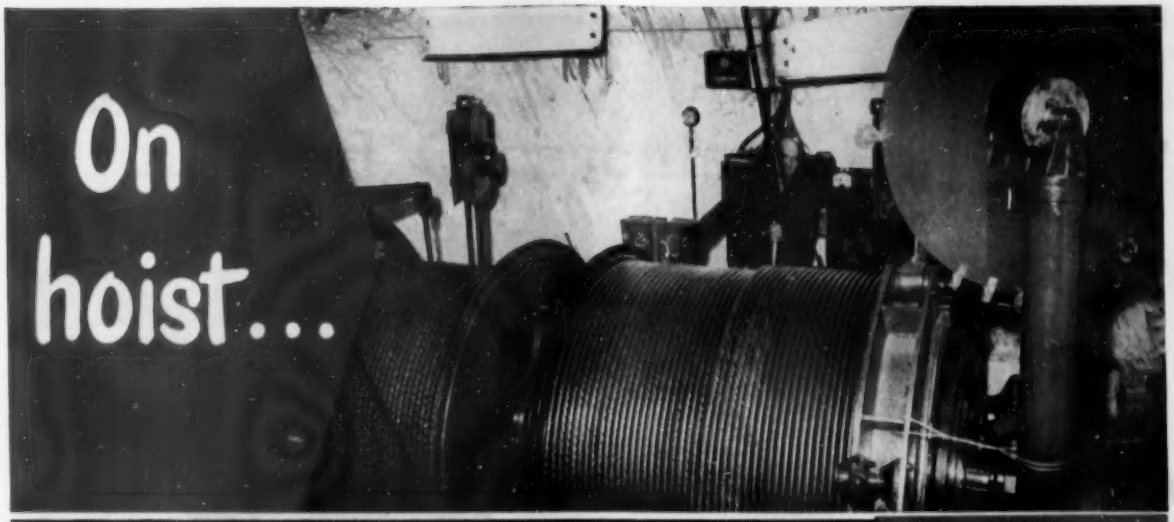
Here's why AnacondA shuttle car cables last longer

Did you know that recent surveys in 15 mines show ANACONDA flat-twin cables today last 300% longer than cables used on shuttle cars only a few years ago? Here's why. These cables have a *specially-compounded* neoprene jacket. You can't cut, tear or abrade it easily. Insulation is a new, harder-wearing form of cold rubber. An improved stranding, and a brand-new ground strip make this cable a lot tougher and a lot safer to handle.

Ask your Anaconda or distributor salesman to show you why you'll get more life out of this new cable—more safety—and more real economy. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

the right cable for the job **ANACONDA®**

WIRE AND CABLE



lower cost-per-ton because

Edwards Wire Rope stays on the job

WIRE ROPE that stays on the job with less down-time for replacement means safer operation and assures you lower cost-per-ton of material moved.

There's an Edwards Wire Rope built to give you long, trouble-free service on each specific mining operation, from hoisting to scraper work.

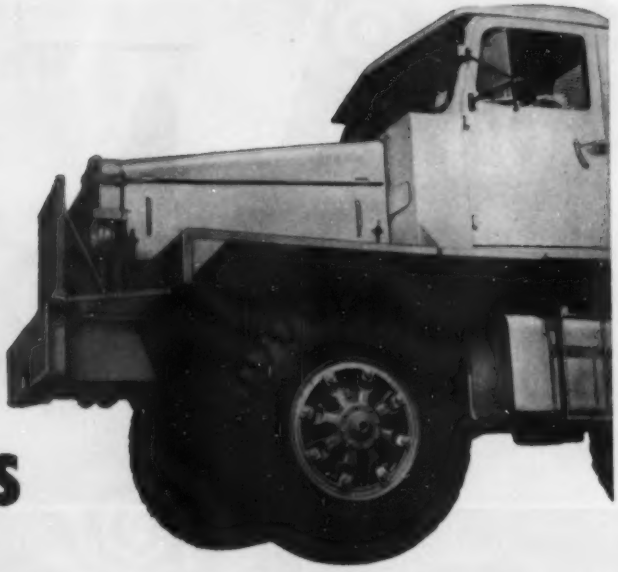
Technical Field Representatives are at your service on request, to help you select the right rope for every job from the complete Edwards line.

EDWARDS WIRE ROPE

E. H. EDWARDS COMPANY

General Office: SOUTH SAN FRANCISCO, CALIF., Los Angeles, Houston, Seattle, Portland

TWO NEW MACK 4-WHEEL DUMPERS

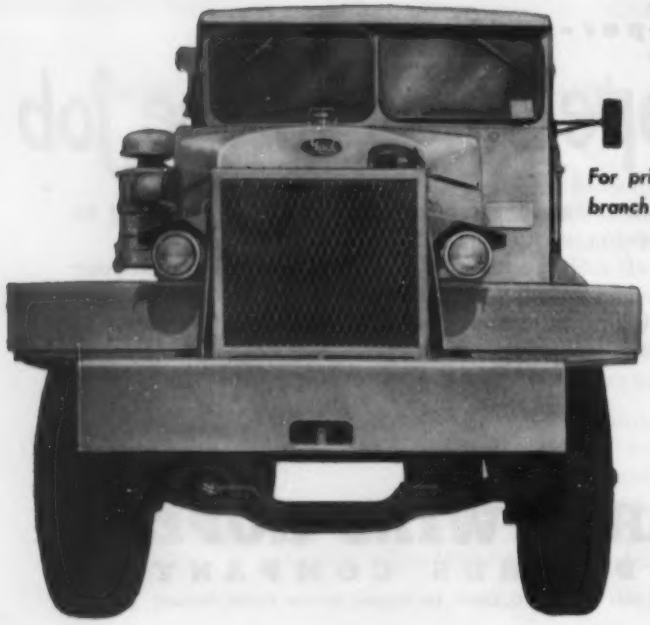


15-ton and 22½-ton payloads for earth moving and ore hauling

Here are two new Mack 4-wheel dumpers that are modified versions of famous Mack 6-wheel off-highway trucks. Simplified in design—yet with no sacrifice of brawny Mack construction—they bring BIG-MACK ADVANTAGES within the means of every large-volume hauler of earth, rock, and ore.

Here are the highlights:

	15-TON PAYLOAD MODEL LRX	22½-TON PAYLOAD MODEL LVX
ENGINE, STANDARD DIESEL OPTIONAL DIESEL	Mack Thermodyne Cummins NHB	Cummins NHBS Cummins NHRBS
CLUTCH	Mack 2-plate	Mack 2-plate
TRANSMISSION	Mack 9-speed	Mack 9-speed
TORQUE CONVERTERS	—	Allison or Schneider
REAR AXLE	Mack triple reduction with Dual Reduction carrier and Planidrive at wheels	
POWER-ASSIST STEERING	Optional	Standard
FRAME, I-BEAM, SIZE MATERIAL	12⅛" x 6¼" x ¼" Alloy Steel	13-11/16" x 8" x 5/8" Alloy Steel



For prices and detailed information, see your nearest Mack branch or distributor.

Mack Trucks

Mack Trucks, Empire State Building, New York 1, N. Y.
Factory Branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

2637

Drifts and Crosscuts

Who's Got the Mercury?

With mercury recently selling at an all time high of $301.00 per flask in New York—and almost unobtainable at that price—the industry is naturally justifiably bewildered about "who's got the mercury."

The truth is that the United States government has got the mercury, in fact has had a corner on world supplies since 1949 when some 80,000 flasks were purchased from Italy. From 1950 through 1953 annual imports averaged about 70,000 flasks. In 1953 imports totaled 85,784 flasks and for first six months of 1954 44,096. These imports were the result of barter deals where the government traded off agricultural surpluses.

And the government's craving for mercury continues as evidenced by the long term purchase program, at a fixed price well below recent markets, for the United States and Mexico. This will be supplemented by special contracts with Canadian and other producers wherever possible.

No other country seems to be so interested in mercury. With sources of world supply from relatively few mines so well known there is no secret about production or destinations of important shipments. All figures available indicate that no other country has been acquiring mercury other than for normal industrial uses.

Most popular belief is that mercury is going into the Atomic Energy Program, yet AEC officials have categorically denied that such great quantities of mercury are needed. However, if such a denial is in the best interest of national security and mercury is used why haven't other countries built up their own supplies of what would be a key material? The British, Canadian, and for that matter the Soviet governments have not secured even a small percentage of the known United States stocks. These three countries are going all-out to expand their Atomic programs.

This means that an Atomic use denial must be questioned and could lead to the belief that there could be some new and super secret strategic use for mercury. So secret that even in this day of ever increasing Atomic-information-sharing that the United States government has not shared its mercury secret with other countries.

Other than such a new use there appears to be only one answer. And that goes right back to Atomic Energy. Not as a consumable material in a nuclear reaction but rather as a coolant or heat exchanger for power plants. Significant is the fact that the coolant to be used in the first central-station atomic power plant now being built at Shippingport, Pennsylvania by Westinghouse Electric Corporation has not been announced.

Whatever the need for mercury may be the United States is well supplied—better so than any country in the world. Estimates of the stockpile of mercury have been 200,000 to 250,000 flasks by industry leaders. Annual industrial consumption has only been between 50,000 and 60,000 flasks in recent years.

Education of the President

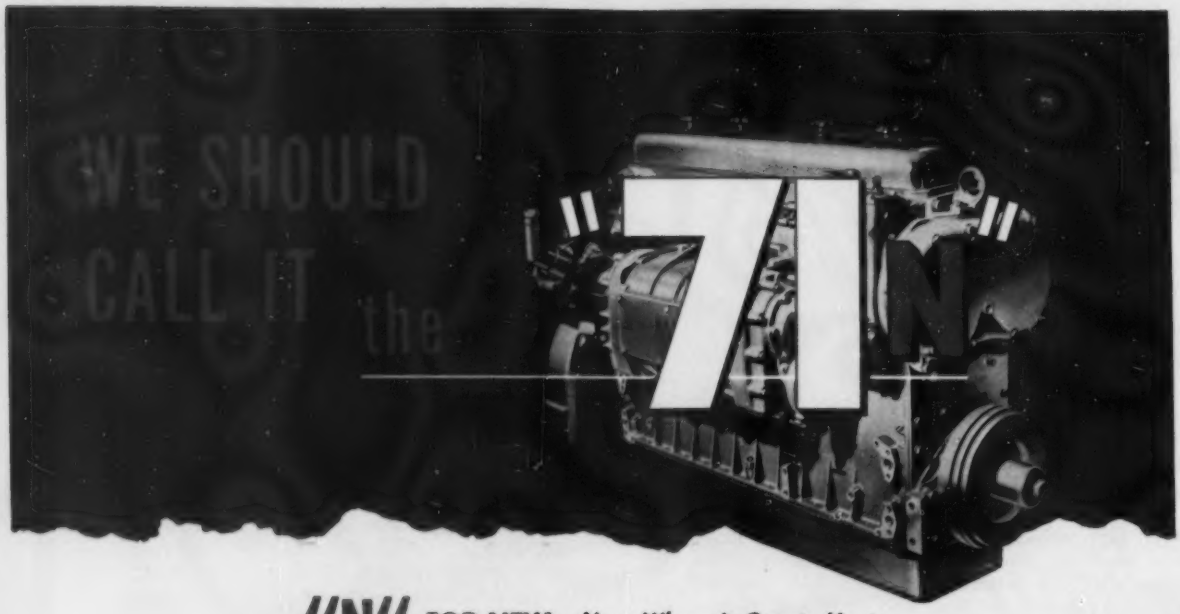
The decision of the President to reject the recommendation of the Tariff Commission to raise lead and zinc tariffs was a disappointment to the producers of those metals. The producers through the National Lead and Zinc Committee had presented their case, a most valid one, which showed beyond a question of a doubt that the industry had been damaged. They had won all the battles, but not the immediate victory.

Temporary victory as a result of increased lead and zinc prices which stem directly from the President's statement that up to 200,000 tons of domestic lead-zinc could be bought up to July 1, 1955 for long term stockpiling.

The President's directive to the Secretary of State that he request foreign lead and zinc producing countries not to take unfair advantage by shipping in large tonnages as domestic stockpiling creates a market void can well be some wishful thinking. Wishful thinking in view of the recent foreign accomplishments of the State Department.

Victory, other than for the time being, and for the not too distant future at that can well be in the President's last sentence and promise: "If the course of action above outlined [for lead and zinc] has not accomplished the objectives we seek, I will be prepared early next year to consider even more far reaching measures, and to make appropriate recommendations to the Congress."

These are words of both understanding of the domestic mining industry's problems and hope of their solution. The mining industry has gained a victory by winning its education campaign at the White House.



"N" FOR NEW—*New Where It Counts Most*

You don't have to be an old-timer to remember when the first General Motors Series 71 Diesel was introduced. We called it the "71" in 1938 and we call it the "71" today.

But in 17 years these design improvements from top to bottom have given operators higher horsepower, lower fuel consumption and longer engine life. And now, a whole series of new improvements has made this fast-stepping, compact, 2-cycle Diesel better than ever.

NEW **17 TO 1 COMPRESSION** gives better fuel economy, squeezing more power from every gallon of fuel.

NEW **"FIGURE 8" CYLINDER LINERS** give you a cleaner burning, more efficient engine. Air intake area is increased 32% for more complete fuel burning and better exhaust.

NEW **IMPROVEMENTS IN PISTON PIN, PIN RETAINER AND CAM FOLLOWER DESIGN** mean longer life, less maintenance cost. High-valve unit injectors last longer because the valve assembly is away from high cylinder temperature areas. Hard-chrome steel "Lite-Tite" piston rings resist wear; are tougher and more flexible and give many more hours of service.

And—best of all—in your next overhaul you can incorporate any or all of these new improvements in any GM Series 71 Diesel engine you're operating today. "The Inside Story" tells you how these new improvements can help cut your costs and speed your jobs. Mail the coupon today for your copy.

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Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.

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Please send me booklet "The Inside Story"

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Fred Yarcho, mill superintendent, Lincoln Division, Wah Chang Mining Corp., Tempiute, Nevada.

"Unoba...the ideal lubricant for crushers"

"Union's UNOBA grease is doing a fine job for us here at Tempiute. The way it stands up under the rugged shock, water and abrasive conditions common to ore milling makes it the ideal lubricant for our intermediate and fine crushers.

"To bring it right down to cases...I've found nothing, for example, equals UNOBA for protecting the vital threads in cone crushers like this Symons 5½ short-head which we use for intermediate reduction of Tungsten ore."

Many critical lubrication problems have been solved in the mining industry by this remarkable Barium-Lithium base grease...New *Improved* UNOBA, now immediately available from your nearby Union Oil representative.

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USED EQUIPMENT THAT MEETS YOUR NEEDS —COST-WISE AND WORK-WISE!

Only from your CATERPILLAR DEALER —a $10,000 guarantee on "Bonded Buy" used Caterpillar-built mining equipment. Other big values in used units of any make!

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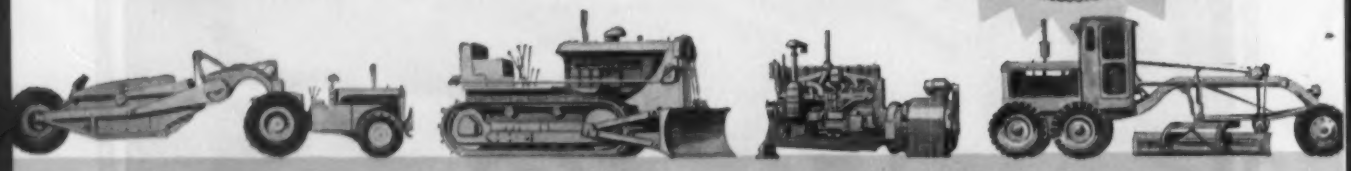

Check your equipment line-up against your job set-up—can you strengthen it anywhere with a used unit? For the best buys, see your Caterpillar Dealer! He offers you big values across the board in used tractors, engines, motor graders, scrapers and wagons for stripping, cleaning face, feeding the shovel, hauling coal or overburden, exploration, building and maintaining roads and other mining jobs!

Cost-wise and work-wise, you'll find what you want in his lot. For big-production value, there's "Bonded Buy"—used Caterpillar-built equipment with a guarantee backed by a bond of $10,000, issued by The Travelers Indemnity Company. You get this guarantee with your purchase of a "Bonded Buy" unit. For other big values, there are "Certified Buy" and "Buy and Try" classifications. These cover used units of any make, honestly labeled and backed in writing.

No buying blindfolded—you know what you're getting from your Caterpillar Dealer. Your best source of new equipment, he's also your best source of used equipment. See him today for your best buy!

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DIESEL ENGINES • TRACTORS
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YOU KNOW WHAT YOU'RE BUYING FROM YOUR CATERPILLAR DEALER

Your Caterpillar Dealer offers three classes of used equipment, and backs each one in writing. You buy with confidence, sure that the equipment is honestly described.

(1) **"BONDED BUY."** Only the best in used Caterpillar Diesel Tractors, Engines, Motor Graders and Earthmoving Equipment. Each "BONDED BUY" machine is backed by a Dealer's Guarantee Bond equal to the purchase price of the unit up to a maximum of $10,000. This provides a guarantee for thirty days against unsatisfactory performance due to defective parts. If a part should prove defective within the guarantee period under the normal conditions of your job and with proper maintenance, your dealer will put your unit back into operating condition *with no charge to you for parts and labor* up to the amount of the bond. The Dealer's Guarantee Bond is backed by The Travelers Indemnity Company. Your Caterpillar Dealer gives you this protection with your purchase of a "BONDED BUY" unit. Look for the "BONDED BUY" symbol—it's your assurance of the best in used machines.

(2) **"CERTIFIED BUY."** "Certified Buy" covers units of any make in good condition. Your performance guarantee is in writing backed by your Caterpillar Dealer.

(3) **"BUY AND TRY."** Bargains in used machines of any make. Buy and try them for a period mutually agreed upon by you and your dealer. Each "Buy and Try" unit carries his written "money-back" agreement.

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GENTLEMEN: Send me, without obligation, more information on "Bonded Buy."

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Capitol Concentrates

Wenden Manganese Depot Closing Looms For January Under Present Quota

In a memorandum dated August 18, 1954, addressed to Office of Defense Mobilizer Arthur S. Flemming by his staff and released to several interested Senators and Representatives, it is recommended that at this time no additional quota of units be assigned to manganese purchase depots such as the one at Wenden, Arizona. The memorandum states, "it has been decided that before considering further any expansion of these operations, it would be advantageous to await the outcome of research projects to be completed during the balance of the year and also of the intensive review of the quality of ore now in the stockpile and to be delivered to the stockpile under existing contracts." The Wenden quota will be saturated in January of 1955 and should Professor Flemming go along with this recommendation it would mean the shutdown of the Wenden purchase depot and the ruin of scores of mine operators there.

Among other nonsense the memorandum states: "A review of the supply situation, including stocks at hand and probable deliveries against Defense Production Act program contracts, indicates that the minimum stockpile objective has been exceeded by a wide margin and that the long-term objective is already being approached. If we take into account maximum possible deliveries under certain Defense Production Act contracts, the long-term objective also may be exceeded."

Much stress was laid upon the fact that domestic manganese produced for the purchase depot and nation-wide carlot programs costs more than twice that of manganese bought on the current market.

The nation-wide carlot program of 19,000,000 long ton units had, to the date of the memo, received only a little more than 1,000,000 units. Should this program be saturated before the expiration date of June 30, 1958, ODM says "the goal will be increased in the interest of developing and maintaining our domestic mobilization base." This is one of those fine phrases from the President's Mineral Policy of March 26, 1954. ODM does not say, however, that the 1958 date will be extended.

The better treatment of the carlot program may be for one of two reasons or both: (1) that it is not really expected the 19,000,000 unit quota will be filled by June 30, 1958; or (2) that ODM prefers to receive only manganese privately upgraded to specification, thus automatically eliminating questionable low-grade ore purchases.

• Small Mining Again Overlooked

After looking over the list of government plans for financial aid to practically every industry from atomic energy to fishing, as outlined in a new booklet of the Small Business Administration, one comes to the conclusion that the "forgotten" industries are those small mining enterprises which need money for development and getting into production. That is, unless the project is out of the country!

• Korean Tungsten Mines Are Closed

Low prices for minerals are causing trouble in more places than the United States. Due to the expiration of the Korean-United States tungsten agreement Korea is at the mercy of the free world market price and as a consequence has shut down tungsten operations in South Korea, throwing some 4,000 miners out of work. Even with low foreign labor costs prices can get too low for successful operation.

• "Very Fine Reaction" Not Defined

After Senator George Malone delivered to the President the colossal report of the Senate Special Subcommittee on Minerals, Materials and Fuel Economics, he told reporters that he received from Mr. Eisenhower "a very fine reaction." On being contacted later by the press, the White House declined to define what the Senator meant by "a very fine reaction." Considering the time, money and effort which was expended on the Malone hearings, reported in 10 massive volumes, and the important conclusions contained in the report, one would have thought that the White House could have taken a few minutes for constructive comments.

• Manganese-Butter Rumor Continues

Persistent rumors still float around Washington that the State Department is negotiating a manganese-butter swap with Russia. Not too long ago, it will be remembered, a private entrepreneur proposed such a deal and the resulting high wind about blew his hat off.

• India Drops Export Duty

India's abolition of the export duty on manganese shipments should further cheapen the market and will no doubt make the Office of Defense Mobilization even more reluctant to pay the price for domestic manganese.

• PMPC's Report Should Be Issued

Now that the President has rejected the Tariff Commission's recommendations to increase lead and zinc tariffs and has expressed a hazy sort of policy, perhaps the President's Mineral Policy Committee can come out of hiding and make its report public!

AMERICAN ZINC, LEAD AND SMELTING COMPANY

Buyers of Zinc Concentrates Suitable for Smelting in Retort and Electrolytic Smelting Plants, also Buyers of High Grade Lead Concentrates.

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"BUNKER HILL" brand of refined Pig Lead, Slab Zinc, Cadmium crude Antimonial Lead and Leaded Zinc Oxide.

We are proud of our "BUNKER HILL" trade mark. It represents the highest quality of metals produced. We likewise strive to make "BUNKER HILL" known as a symbol of the highest quality in our relations with our employees, with our suppliers of ores and concentrates, with our stockholders and with the general public.

For information regarding ore rates and shipments Address:

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Capital Concentrates

• Wheat-For-Metal Swap Is Arranged

The State and Agriculture Departments are busily arranging for swaps of surplus food stuffs for strategic and critical minerals. The first of these deals to be actually consummated is the exchange of 100,000 tons of No. 2 hard winter wheat for thorium and monazite. It is understood that Indian manganese is being considered and that lead and zinc may be next. The plan for the wheat swap entails handling it through private trade channels and if other commodities are handled the same way there should be a nice profit in it for someone.

• Committee Accepts Malone Amendment

The Senate-House Conferees on the Mutual Security (FOA) bill agreed to accept the Malone amendment which deleted the section of the bill dealing with aid to the production of foreign minerals. Whether this was because the House members are getting protectionist minded or because the section was traded against another which the House wished to retain is hard to say. Anyway, Senator Malone got in his Sunday punch and it has stuck.

• "Trade, Not Aid" Scores Again

The Congress has passed H.R. 8155 suspending until June 30, 1955, duties on metal scrap. This action was taken in spite of the fact that scrap is a drug on the domestic market. "Trade, not aid" as a political philosophy is affecting more than the lead-zinc industry.

• Additional Funds for DMEA

It is heartening to note that the Office of Defense Mobilization has granted the Defense Minerals Exploration Administration an additional $6,000,000 to finance 1955 projects. The admirable work DMEA has been doing under the able direction of C. O. Mittendorf stands as a prime example of what a well-run government agency can do if the will is there. Mittendorf is aided by an unusually capable staff, the members of which are dedicated to doing their job sensibly and with a minimum of red tape.

COMING CONVENTIONS

October 1 and 2, 1954. Annual meeting of the TRI COUNTY MINING ASSOCIATION. Grand Coulee, Washington.

October 5 through 9, 1954. Annual fall meeting INDUSTRIAL MINERALS DIVISION AIME, Lake Placid, New York.

October 13 through 16, 1954. Third annual conference on ATOMIC ENERGY IN INDUSTRY, Hotel Commodore, New York City.

October 14, 15, 16, 1954. NEW MEXICO MINING ASSOCIATION and SOUTHWESTERN INTERNATIONAL MINING ASSOCIATION joint meeting. Carlsbad, New Mexico.

October 14 through 16, 1954. University of Minnesota, Center For Continuation Study. Third DRILLING SYMPOSIUM. Main Campus, Minneapolis, Minnesota.

October 18 through 22, 1954. The 42nd NATIONAL SAFETY CONGRESS AND EXPOSITION. Sessions at five hotels in Chicago, Illinois.

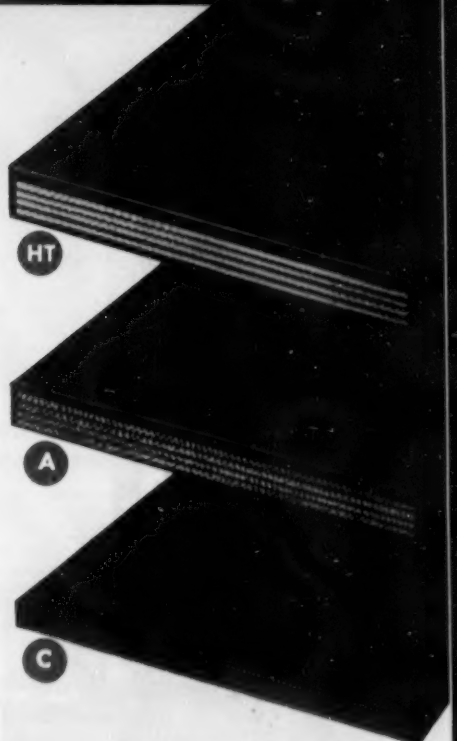
October 27, 28, 29, 1954. Third NATIONAL CLAY MINERALS CONFERENCE, Rice Institute, Houston, Texas.

October 28, 29, 30, 1954. ROCKY MOUNTAIN REGION INDUSTRIAL MINERALS CONFERENCE AIME. Salt Lake City, Utah.

Thermoid Conveyor Belting cuts handling costs on rugged mining jobs

There's a Thermoid Conveyor Belt designed to lower your handling costs on every mining job. Here are three examples: HT —For extremely abrasive materials such as coal, granite, trap rock, flint rock, quartz ore; A —For slag, lime rock, crushed stone and other highly abrasive materials; C —For moderate abrasives such as sand, loam, soda, gravel.

Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life . . . lower your handling costs per ton. Your Thermoid Distributor carries a complete line of Thermoid Conveyor Belting, Multi-V Belts and Hose to meet the most severe requirements of any mining operation. Call him or write direct for full information.



Thermoid Western Co.

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Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Nephi, Utah Trenton, N.J.

Multiple-part Red-Strand Slings are always trusted to handle heavy loads. They are easy to apply to both the load and the crane hook. User tests in Detroit proved Red-Strand slings withstood unusual abuse, yet maintained higher-than-rated strength.

A Gary plant uses Red-Strand single-part slings for many lifting jobs like this. These slings are available with various combinations of end fittings for attaching the sling to rings or lugs. Single-part slings frequently are the most economical to use.

How to Select the Correct Sling for Your Job

A heavy cylindrical load like this usually calls for the use of multiple-part Red-Strand Flat-Laced slings. They are strong, flexible and do not slip or abrade on smooth round surfaces.

Start your sling selection by analyzing five factors:

1. The load—its size, weight, shape, finish.
2. Working area, amount of head room.
3. Size and type of crane hook.
4. Angle of sling legs.
5. Location and type of lugs or rings, if any.

This is basic information. From it, your supplier can recommend the sling by type, size and length that is safest, longest lasting and most economical for your job.

Types of Slings

Multiple-part slings are always recommended for heavy duty service, because for equal strength they are far more flexible than single-part slings. They hug the shape of the load easily, present a greater bearing surface to the load, and reduce the possibility of marring finely finished surfaces.

Where these factors are not so important, either Red-Strand ***single-part slings*** or ***grommet slings*** may be used for economy. Single-part Red-Strand slings are often recommended for lifting lighter weight objects, or those that have fixed attaching rings or lugs. Grommet, or continuous strand Red-Strand slings are ideal for forming hitches of various types without fittings.

How to Gain Extra Savings

Two suggestions will help you save money on slings.

Re-useable Pin-Lock thimbles reduce sling costs by 21%

The first is to re-use Pin-Lock thimbles on multiple part slings. They increase sling life by protecting loops from abuse or damage. Besides, these exclusive Leschen Pin-Lock thimbles cut sling costs on an average of 21% because they may be used again and again. They lock into sling loops with pins instead of permanent clamps, permitting re-use, and eliminating constant expense of thimble replacements.

The second suggestion is to use Red-Strand slings—for a very simple but good reason: Red-Strand slings are made of ***higher-than-rated*** quality Leschen wire rope that delivers ***longer-than-expected*** service.

Get a copy of Leschen's ***Sling Handbook*** for complete information. Ask your Leschen man for one, or write.

LESCHEN WIRE ROPE DIVISION
The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri

LESCHEN
HERCULES Red-Strand
WIRE ROPE

Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

October, 1954

INTERNATIONAL PANORAMA

WASHINGTON, D. C.—Metallurgical grade fluorspar has been added to the list of minerals to be purchased from domestic mines under the "long term" stockpiling program of the Office of Defense Mobilization.

WINNEMUCCA, NEVADA—The Utex Exploration Company is diamond drilling for uranium ore in Virgin Valley. Utex operates the nation's largest uranium mine—the Mi Vida—southeast of Moab, Utah.

BALTIMORE, MARYLAND—The Glidden Company will build a pilot plant here for the production of titanium metal by a new electronic process.

GEORGETOWN, BRITISH GUIANA—Aerial geological photographing of 38,000 square miles in central British Guiana has been started by Spartan Air Services Limited.

FRANKLIN, NEW JERSEY—New Jersey Zinc Company is closing its oldest mine—The Franklin, where New Jersey Zinc got its start in 1848. All ore has been mined to make closing necessary.

WASHINGTON, D. C.—The DMEA has been authorized by Office of Defense Mobilization to spend an additional $6,000,000 on joint government-private exploration projects during the 1955 fiscal year.

GRAND JUNCTION, COLORADO—Vernon E. Pick, uranium prospector, has sold his Delta uranium mine in Emery County, Utah for $9,000,000 to Atlas Corporation.

VIRGINIA, ORANGE FREE STATE—Diamond drilling has indicated the possibility of developing a new gold-uranium mine north of and adjoining the Harmony and Virginia mines.

SALT LAKE CITY, UTAH—More than $11,500,000 has been raised in Utah during the last year by sales of stock in uranium companies. More than 100 companies have sold stock.

MANILA, PHILIPPINE ISLANDS—Benguet Consolidated Mines, Inc. is increasing exports of chromite to the United States to 40,000 tons per month. This figure includes shipments under both private and government contracts.

WASHINGTON, D. C.—The Office of Defense Mobilization has established an interim goal of 37,500 annual tons of metallic titanium by the end of 1956.

VANCOUVER, BRITISH COLUMBIA—Granduc Mines Limited has developed two important copper ore bodies by diamond drilling and underground prospecting. The East ore body has been developed for 1,300 feet long, 107 feet wide and assays 1.70 percent copper.

BATHURST, GAMBIA—Gambia Minerals, Ltd. has signed a 30-year agreement with the Gambian government for developing of titaniferous minerals.

TONOPAH, NEVADA—Calumet and Hecla, Inc. has plans for deep development of the King Tonopah mine here. Summit King Mines, Ltd. has terminated its exploration and mining program carried on at shallow depths.

SAN FRANCISCO, CALIFORNIA—Mercury has been traded at an all time record high price of $301.00 per flask. Large supplies are unobtainable at this record price, however.

MIDLAND, PENNSYLVANIA—Rem-Cru Titanium Company will expand titanium metal and titanium alloy production facilities to 11,500 annual tons. The increase will be 2,500 tons per year with issuance of a Certificate of Necessity to speed expansions.

SHEFFIELD, ENGLAND—Imperial Chemical Industries is expanding production of titanium metal to 1,500 annual tons in 1955 by enlarging its present pilot plant.

JOHANNESBURG, UNION OF SOUTH AFRICA—Output of gold from Witwatersrand gold mines in July exceeded 1,000,000 fine ounces for the first month since May 1950. Output was 1,000,006 ounces, up from 976,962 in June.

JUNEAU, ALASKA—The high price for mercury has encouraged prospecting in Alaska with some new discoveries reported in the lower Kuskokwin district.

Homestake Sells Leases On Utah Uranium Claims

Homestake Mining Company, primarily known for its gold-producing activities, has sold a group of uranium claims, the Waterfall group of San Juan County, Utah's Big Indian district. The properties were prospected by Homestake by diamond drilling after being staked by H. W. Balsey of Moab, Utah.

Uranium Ventures, Inc., Grand Junction, Colorado, acquired the claims on assignment from Homestake, later selling its 50 percent interest to Seagull Uranium Company for $65,000.

Shaft sinking to a depth of 238 feet to reach an ore body started September 1. Mr. Balsey will get 25 percent of the gross from shipment of the first 200,000 tons of ore. Homestake gets $75,000.

Eagle-Picher Purchases Calumet Zinc Properties

The Eagle-Picher Company has purchased from Calumet & Hecla, Inc. all of its zinc properties in the Wisconsin-Illinois field which includes leaseholds on approximately 3,650 acres of land, as well as a mill, supplies, and materials. This acquisition will more than double Eagle-Picher's zinc ore reserves in this area.

Calumet & Hecla has operated these properties since 1948 when they were acquired from a development subsidiary. The zinc-lead mine at Shullsberg, Wisconsin had been in production since 1951 producing about 1,200 tons of zinc-lead concentrate per month.

In 1953 Eagle-Picher purchased the mining properties and equipment of Bilharz Mining Company and the Gordon mine of American Smelting and Refining Company. Both of these were in the Tri-State district.

Rich Lead-Zinc Deposits Reported in Greenland

Underground exploration work which was conducted throughout the year (winter and summer) in Greenland apparently has been successful with the reported discovery of lead and zinc deposits worth $15,000,000 at Mestersvis. Operations are scheduled to start in the spring of 1956 with first shipments to begin that autumn.

Nordish Mineselskab A/S is the firm which will undertake the development work. It was formed by capital from three nations. The Danish government contributed 27½ percent, Danish companies 27½ percent, and two Swedish companies and one Canadian firm also participated. The Swedish firms are Bolidan Gruvaktiebolag and Sotre Kopperbergs Bergslags Aktiebolag. The Canadian firm is Ventures Ltd. which has a minority interest.

THIS TRUCK-MOUNTED magnetometer continuously records total field intensity. United Geophysical developed the unit.

Use of Geophysics Pays Off at Pima With Disclosure of Copper Orebody

One of the more outstanding events in the history of the mining industry—the discovery of a major copper deposit by geophysics—has been quietly gaining headway at the Pima Mining Company's property 17 miles southwest of Tucson, Arizona. Here, in a typical desert setting of sagebrush and cactus which is devoid of surface mineral indications, this company has located and is currently developing a promising copper ore body buried under 200 feet of alluvial wash.

The chain of events leading to the discovery of this deposit might be summarized as follows:

1. A decision to inaugurate an exploration program in which activities would be concentrated on alluvial covered areas.
2. The selection of a suitable site for operations.
3. Through geologic study, magnetic, electromagnetic, and self-potential surveys, the presence of a possible ore deposit was disclosed.
4. Surface drilling proved that copper mineralization was present.
5. Shaft sinking and development are now proving an economic and mineable copper deposit.

Oil Contractor Now a Miner

Work was started back in 1949 by the United Geophysical Company, parent company of the Pima organization. A contractor in geophysical exploration for oil, United Geophysical was also actively engaged in adapting its methods to suit the particular needs of the mining industry. They found, however, that major producers were only mildly receptive to undertaking a geophysical exploration campaign.

United Geophysical then set out to prove what could be done by applying scientific methods coupled with skilled geologic interpretation. The plan was to concentrate activities in alluvial covered areas, since surface indication would be quite largely masked. The development of the Pima mint stands as a monument to progress. This newcomer to the ranks of the metal producers is continuing to outline the deposit in order to develop the venture into a profitable long-lived mining enterprise.

Area Selected for Experiment

The initial work began with on-the-spot visits and rough geological reconnaissance of some 30 areas. This was followed by library work and investigation of the literature of those districts which seemed to offer the most promise for a geophysical project. Specific guides used in selecting a region were: known mineral occurrences; history of past production; type of host rock present; and presence of favorable structure which could reasonably be projected into unexplored areas. Following 2 to 3 months of library research and inspection of the several districts under consideration, the Pima area was selected as the site to pinpoint the investigation.

Magnetite was known to be an accessory mineral often associated with ore deposits of the region; in addition, much of the area was covered by valley fill and alluvial wash. The district had a history of sporadic production of zinc, copper, silver, and lead along with minor amounts of molybdenum. Work was localized in the Mineral Hill area in the northeastern part of the district, since structural relationships there suggested the existence of blind deposits.

Geology

As a rule, the known ore bodies of the district occur at or near contacts of intrusive granite with Paleozoic limestones and quartzites. They

lay in metamorphosed sediments which often underwent alteration to garnet or kaolin. Structural breaks that originate at or near the contact and which cut the sedimentary formations appear to have been the controlling factors in ore deposition. Those few deposits exposed at the surface have been developed and worked intermittently. The ore bodies are classified as contact metamorphic types.

A study of the Mineral Hill area (one-half mile west of Pima's present operation) revealed that it consisted of two blocks of sediments broken by an east-west thrust fault dipping 50 degrees to the south. These sediments form a small group of hills surrounded by alluvium, except to the west where the granite outcrops in contact with them. The western block of sediments appear to be overturned with Cambrian, Devonian, Pennsylvanian, and Permian formations exposed and dipping steeply to the south. South of the fault Pennsylvanian and Permian sediments outcrop in normal sequence.

Contact Zoning

The ore deposits occur in favorable sedimentary members along the fault zone and in close proximity to the intrusive rocks. Contact-zoning of high temperature minerals occurs within the ore bodies. Deposits are irregular in shape and distribution. The chief ore mineral is chalcopyrite, although bornite and chalcocite are sometimes found. Minor amounts of zinc, molybdenum, and tungsten also occur. Locally, magnetite and pyrrhotite are present in varying quantities in close association with the ore minerals.

Structural Control

It appeared that the major structural control which accounted for localization of the deposits at Mineral Hill was the thrust fault zone. It seemed logical that the immediate area to the east, though covered with an overburden of alluvium, might reveal possible unknown ore bodies if the fault continued and if it again cut favorable host rocks.

With this in mind, United Geophysical began preliminary mapping and test work to determine the amenability of geophysical methods in November 1949.

Samples of rock taken from old underground workings were tested to determine magnetic susceptibility, density, and conductivity. Trial surveys over known deposits and test work on the samples indicated that

TRIPOD MOUNTED Magnetometer was key to discovery of the Pima deposit. This unit measures vertical field intensity.

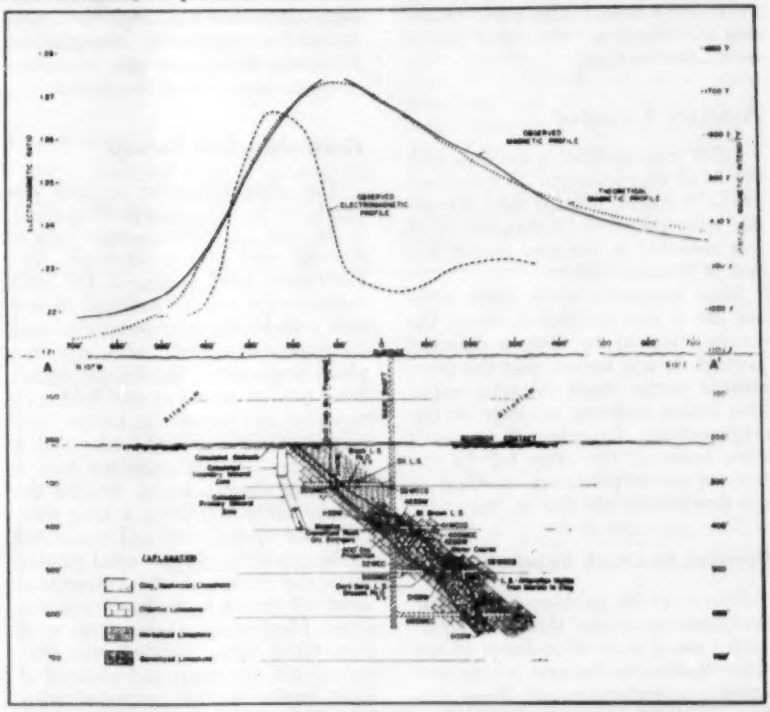
the ore minerals possessed sufficient property contrasts with the country rock. It was decided to follow this with a preliminary magnetometer reconnaissance of favorable parts of the district.

Magnetometer Survey Begins

Work began with a standard Anskania-Schmidt, tripod-mounted vertical intensity magnetometer. Readings of the vertical component of the magnetic field (obtained in gammas) were taken along grid lines spaced at 400-foot intervals and at right angles to a base control line. The scale on the instrument read directly to about 10 gammas with estimations possible to two gammas. To compensate for diurnal variations which occur in the earth's field intensity, the instrument was returned to a base station periodically and a reading taken so that correction factors could be computed. Readings were taken every 12.5, 25, or 50 feet along the grid lines depending on relative changes in the observed field intensity.

Truck-Mounted Magnetometer

Later United Geophysical developed its truck-mounted, continuously recording, total intensity magnetometer. This unit was designed to bridge the gap between the slow, tedious, tripod instrument (used initially at Pima), and the airborne magnetometer. Disadvantages of the former are obvious. The instrument must be set up and leveled at each station, only one component (either horizontal or vertical) of the field is recorded, and it must be returned to a base station to compensate for natural daily variations. Airborne magnetometers are excellent for determining broad structural characteristics, particularly in



THIS SECTION across the orebody shows the relationship between the deposit and profiles of the magnetic and electromagnetic anomalies. Interpretation of the geophysical data led to a drilling program which disclosed the presence of ore.

THE SHAFT HEADFRAME and 80 ton ore bin of the Pima Mining Company mark another new development for the southwest. Mine cars are hoisted in the cage and dumped by the rotary mechanism at the top of the bin. Ore is trucked to the rail head.

inaccessible areas. However, the magnetic field strength varies inversely with the cube of the distance from an isolated dipole. Therefore, resolution and detail are somewhat limited on smaller features.

Anomaly Revealed

After cross-sectioning the area with the hand magnetometer, contour and profile maps of relative field intensities were prepared. A magnetic high was recorded in the area almost due east of Mineral Hill.

Since magnetite could occur without ore it was decided to check the results obtained by using a different method. It was known that the presence of certain basic volcanics might give higher intensity readings on the magnetometer. Experienced geophysicists, however, can often tell by the type of curve produced whether or not fluctuations are due to volcanics.

Decision to Check Results

Essentially the problem was one of producing evidence that magnetite existed along with other forms of ore mineralization in the area which produced a magnetic anomaly. Since preliminary tests indicated that differences in conductivity might exist, the management decided to try an electromagnetic survey. If an anomaly was produced by the two independent methods, the theories based on geologic study and the magnetic survey would be considerably strengthened. It would also prove that a drilling program was at least warranted.

Electromagnetic Survey

The electromagnetic method depends on the difference in the conductivity of electromagnetic waves through rock of various types. The instrument used measured the ratio between the voltage induced in two field coils by the electromagnetic field (vertical component), and also the phase angle shifts. Briefly, the equipment used consisted of two field coils mounted on tripods, a bridge connected across the field coils, and a 400-cycle, 110-volt generator with a 5-to-1 transformer which stepped the voltage up to 550 volts. A long wire, grounded at each end and connected to the generator, was oriented parallel with the strike of the theoretical structure shown by magnetic contour maps. Electromagnetic readings were then taken along parallel grid lines spaced 400 feet apart and oriented at right angles to the grounded wire. The field coils were spaced 50 to 100 feet apart, and the electronic bridge between the coils indicated the intensity of the field and phase relationships induced in each coil.

Results Check Magnetic Work

Utilizing readings obtained by this method, iso-phase and ratio maps and profiles were constructed which outlined an area of abnormal highs. When map coordinates of charts produced by the magnetic and electromagnetic methods were compared, it was found that the anomalies produced by the two independent methods matched very closely, although the magnetic anomaly was displaced several feet south of that shown by the electromagnetic survey. This could be expected in a south-dipping ore body since the magnetic poles would originate somewhere within the ore zone.

Third Survey Checks Results

As another check, a limited gravity survey was tried without much success. Work with this method was not very indicative over the small area under consideration. A self-potential survey produced an anomaly and in general corroborated the data gathered by the other methods. Ground voltages produced by oxidation of the ore body were measured along grid lines similar to those used by other methods. Since oxidation was in evidence, it began to appear that a sulphide deposit had been delineated.

What Geophysics Indicated

Interpretation and calculations made from the geophysical data obtained when analyzed in the light of geologic circumstances of the country suggested that:

1. The depth to the top of the feature was in the neighborhood of 200 feet.
2. The strike of the feature was east-west.
3. Dip of the structure was approximately 60° south.
4. Magnetite was present.
5. The structure was a lineal feature.
6. Copper could be present (as shown by self-potential method).

This evidence, plus the known occurrences of copper with magnetite associated as an accessory mineral, indicated that a test hole was warranted. Accordingly, claims were staked in July 1950, and preparations were made to collar a hole. The first hole was started in February 1951 with a Republic shot hole drill. Bedrock proved to be buried under 205

feet of alluvium. At this point, oxide mineralization was encountered, and sulphide minerals at 255 feet. Assays of the first hole proved to be encouraging enough to justify a systematic drilling program to determine the extent of the deposit. In all, 18 holes were put down for a total of 7,200 feet of prospect drilling. Holes were guided by results obtained from the geophysical prospecting, and information proved by the preceding drill holes.

Drilling Through Alluvium

Due to the cover of 200 feet of alluvium, a departure from standard methods of drilling was indicated. Lacking suitable equipment at the time, a Republic shot-hole rig, ordinarily employed for seismic work, was modified so that it could be adapted for core drilling. All coring was done with AX rods. The tools used for drilling through the alluvium were 2⅜-inches in diameter drill pipe with Hughes 3⅜-inch rock bits. A square kelly with a chuck adapted for the "A" rod was fabricated and fed through the rotary table by gravity.

Later a Joy 22HD diamond drill was obtained. This unit, mounted on a 1½-ton Ford F5 chassis, included: a 20-foot hydraulically-operated mast; a 4½- by 6-inch mud pump; and a drilling head with a hydraulic 30-inch feed. Three and seven-eighths-inch rockbits were used in alluvium. At bedrock, casing was set and coring done with AX barrels.

Shaft Sinking

Results of the drilling campaign were so encouraging that company engineers recommended a shaft sinking program so that further exploration and drilling could be carried out underground. The Pima Mining Company was organized, and construction of a surface plant began in November 1951. Shaft sinking by a contractor began in the middle of January of the following year. The two-compartment shaft measured 4½ by 9½ feet inside dimensions. Sinking continued 400 feet and stations were cut on the 300 and 400 levels.

Some 900 feet of exploration on the 400 level, and 600 feet of drifting and cross cutting on the 300 level were driven. Nine diamond drill holes were drilled downward from the 400 level, cutting the structure at various points down to the 600 level. Results obtained from these holes led to a renewal of the sinking program, and work to that end was resumed in November 1952. By April of 1953 stations had been cut on the 500 and 600 levels, and a shaft sump cut at the 600 level. From April through September lateral development was carried out on these lower levels. A total of 400 feet of drifting and cross cutting was done on the 600 level, while work on the 500 amounted to 600 feet.

The ore body has been explored over 1,000 feet along its strike length. The dip is approximately 45° to the south, somewhat flatter than the 60° dip predicted from the geophysical data. The country rock is altered limestone and quartzite of probable Permian age.

High Grade Zones

Irregular masses of high-grade chalcopyrite occur in a matrix of highly altered limestone. The amount of mineralization varies with the intensity of alteration. The better ore is found in garnetized limestone, or rock in which alteration to kaolin has been almost complete. The zone of alteration varies from 200 to 300 feet wide. On the footwall and hanging wall serpentized limestone is found. This rock commonly contains from 1.0 to 3.0 percent copper. Inside this zone occurs the highly altered garnetized or kaolinized limestone containing the higher grade mineralization. Serpentized material extends to a maximum of 150 feet on both the footwall and hanging wall side of the deposit. Altered arkosic quartzite exists beyond the limestone on both walls and carries approximately 0.7 percent copper.

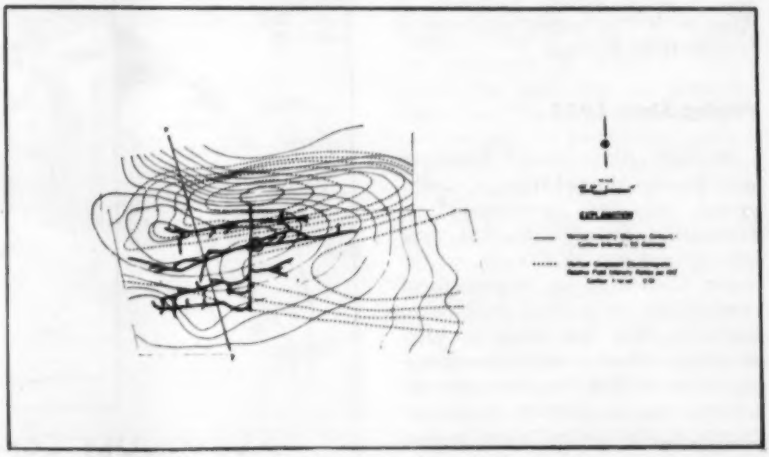
Experimental Stopes

At present the mine is opened on four levels and several stopes are in progress. Final selection of a mining method will have to await the outcome of future exploration. The ore mined to date is being shipped directly to the ASARCO smelter at El Paso, Texas. Some 50,000 tons averaging slightly less than 6 percent copper have been shipped, most of the ore coming from development headings. A company diamond drill crew is maintained one shift per day to completely outline and probe the deposit. An additional drilling program performed by a contractor is now complete.

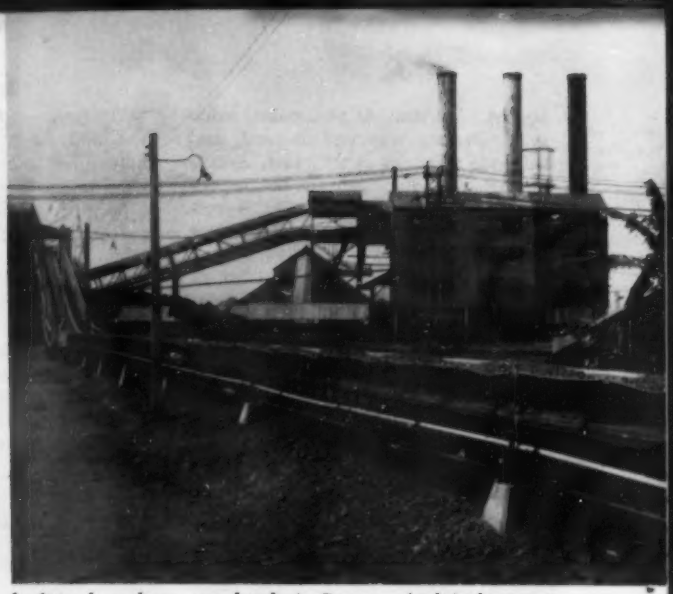
Stoping has now been carried out on all levels. In general slot stopes two or three sets wide are mined across the structure. Pillars, 15 feet wide, are left between stopes. Tentative plans call for recovering these pillars by a Mitchell slicing method. Development headings are usually 5 by 7 feet in cross section where timbering is not required. Joy jacklegs are used for drifting and cross-cutting, while Ingersoll-Rand and Joy stopers are used in the slots. Daily production of 150 tons of ore plus 50 tons of development waste is mined with a crew of 12 to 14 miners and a motor crew of four men.

Job Well Done

United Geophysical, through its subsidiary, the Pima Mining Company, has proved the value of still another tool which the mining industry can effectively use in expanding the frontiers of its search for more minerals. Key men who made this possible include: E. D. Spaulding, manager; R. E. Thurmond, mine superintendent; and W. E. Heinrichs, Jr., acting manager of mining exploration. The Pima discovery was made by R. E. Thurmond and W. E. Heinrichs, Jr., who were then exploration engineers for United Geophysical Company.



TWO ANOMALIES (one produced by magnetic methods, the other by electromagnetic means) are superimposed on a plan view of the mine workings. Note how the magnetic anomaly is displaced to the south of the electromagnetic contours.



PLANT EXPANSION and modernization have kept ahead of bauxite demands. At the Monego Works (left), new drying kilns, a 400-ton-per-hour hammer mill, and enlarged ship loading facilities have been completed. At Paranam (right) changes in the flowsheet and transportation methods have been made to handle increasing tonnages of ore from the new Rorac mine.

New Mines and Plants In Surinam

The largest single source of bauxite for the United States is Surinam (Dutch Guiana), South America. This has been true since 1932 except for the World War II year of 1943 when domestic production set an all-time high. This economically important fact may have been forgotten in recent months because of the much publicized bauxite mines and mining in the Caribbean.

Surinam's current output of bauxite, the ore of aluminum, is more than 50 percent above its peak wartime production, also reached in 1943. A subsidiary of Aluminum Company of America is the largest producer of bauxite from Surinam.

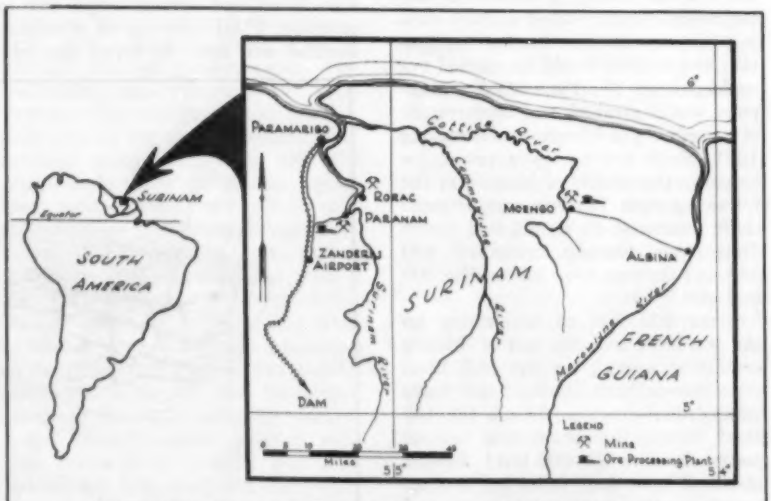
Mining Since 1922

In 1916, Alcoa formed Surinaamsche Bauxite Maatschappij, a wholly-owned subsidiary incorporated in Paramaribo, Surinam. Its first mine development was at Moengo, on the upper Cottica River. Shipments of crushed ore on a small scale were started in 1922, but it was not until completion of a beneficiation and drying plant in 1926 that Surinaamsche Bauxite was in position to supply bauxite to the United States market in really substantial quantities. By 1929, bauxite was the leading export from Surinam; during the past decade, it has averaged better than 80 percent of Surinam's total exports.

This important place in Surinam's foreign trade picture was not attained, however, until a second plant at Paranam went into operation in the early part of 1941. Paranam is better situated than Moengo with respect to ocean transport: it is 25 miles south of Paramaribo on the large and easily navigable Suriname River, while vessels calling at Moengo must travel upstream some 110 miles inland on three rivers, the Suriname, Commewijne, and Cottica. The latter is a narrow, winding stream with a width of barely 150 feet in the last few miles below Moengo.

Production Grows

The record production and shipment for both plants operating on a



ALUMINUM COMPANY OF AMERICA'S SURINAM BAUXITE OPERATIONS

Photographs by Aluminum Company of America

NEW EQUIPMENT speeds mining of bauxite by the Surinam Bauxite Company. At left is a 2⅛-yard shovel and 20-ton steel cars which have replaced smaller units at the Ricanan mine. In the Rorac mine (right) Euclid trucks are being loaded with ore by a 2½-yard dragline. The bulldozer is removing a high-iron cap which covers the underlying bauxite.

Assure Bauxite Supply For Alcoa

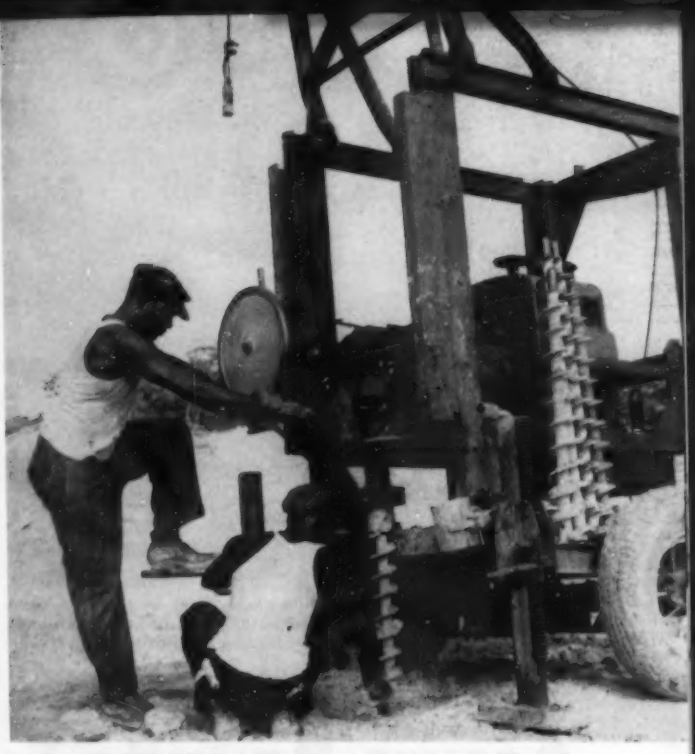
seven-day, three-shift basis during the war was just under 1,600,000 metric tons in 1943. In the following two years, shipments were drastically reduced because of the facts that the wartime aluminum production program was well ahead of schedule and the cargo ships were more urgently needed elsewhere at that stage of the war, but in 1946, a gradual climb to new production highs got underway. By 1951, 2,185,000 tons were extracted with a six-day a week operation, and in 1952, the record was pushed up beyond the 2,500,000-ton mark. These noteworthy post-war increases in output have been made possible in part by the simple means of adding equipment and manpower, but they are largely due to technological advances in mining, milling, and shipping practices.

Open-Pit Mining

The mining and milling processes utilized in the preparation of bauxite for shipment are relatively simple. After the jungle growth has been cleared away and the overburden removed, the ore body, averaging 15 to 20 feet in thickness, is drilled and blasted. Oversize boulders are broken with jackhammers or secondary blasting, and the ore is shovel-loaded into mine-cars for rail transport four to eight miles to the mill. After crushing, low-silica material is conveyed directly to the drying or calcining kilns, while high-silica ores are put through scrubbers to remove most of the clay associated with the bauxite. The bulk of the dried ore is shipped to the United States as metal-grade bauxite for treatment in alumina refining plants, the next step in producing aluminum. The balance of the dried ore, selected for its low-iron content, is shipped as chemical-grade bauxite to producers of chemical products. The calcined abrasive-grade bauxite, selected for its low-silica content, is delivered to manufacturers in the abrasives industry.

ELECTRIC SHOVELS with 2⅝-yard dippers have replaced older machines using 1-yard dippers as part of the mine expansion and modernization program. Note how two shovels load new 20-ton steel cars at the Rikanau mine at Moengo.

The expansion and modernization program at Moengo during the past three years has included many examples of simple additions to existing facilities and technological improvements, as well as combinations of the two. In the mine, tip-cars and trucks have been replaced by Diesel driven



DRILLING SPEED has been increased by use of the new Parmanco truck-mounted drill shown at right. This drill, which replaces hand-held pneumatic machines shown at left, makes possible the use of larger dynamite cartridges.

Dumptors for stripping, and air-driven drilling equipment has been replaced by Parmanco-type drills, one of which is shown in accompanying photograph. This, in turn, has made possible the use of larger dynamite cartridges and improved blasting techniques. One-yard shovels have been obsoleted by 2½-yard electric shovels, and 7-ton wooden mine cars have been displaced by 20-ton steel units equipped with air-brakes.

In the mill, a 400-ton-per-hour hammermill has taken over the crushing operation from small gyratories, and means for by-passing the washers when ore quality permits have been provided. Facilities for stockpiling and reclaiming crushed ore now provide greater operating flexibility. Two new drying kilns added two-thirds to the normal drying capacity of the plant.

Three Grades Produced

Four new dual-purpose calcining and drying kilns, two of which went into operation in July 1953, and two of which were completed in September, will normally take care of the demand for calcined abrasive-grade and dried chemical-grade bauxites, but in an emergency they can also be used for the production of metal-grade ore. Operating flexibility thereby acquires an additional boost. Besides necessary "green" ore platforms, conveying equipment, and coolers, this installation includes two 7,000-ton steel storage bins which feed by gravity onto the shiploader belt.

New Equipment At Paranam

Operations at Paranam are generally similar to those at Moengo, the main differences being the result of the more scattered nature of the deposits being mined and the considerably greater amount of overburden to be handled at Paranam. Track mining is now being supplemented with Diesel-truck haulage from more inaccessible areas, and carryall-type scrapers have been added to speed up overburden removal operations. Washing capacity has been stepped up by redesigning and rebuilding the scrubber equipment, and drying capacity increased by the addition of larger motors and burners on all three drying kilns.

One of the three kilns at Paranam has been operated for the most part in recent years on the production of calcined abrasive-grade bauxite, but with the opening of the new calcining plant at Moengo, this dual-purpose unit can now be returned to drying service. It will, however, continue to be available as a stand-by calciner for use whenever circumstances require.

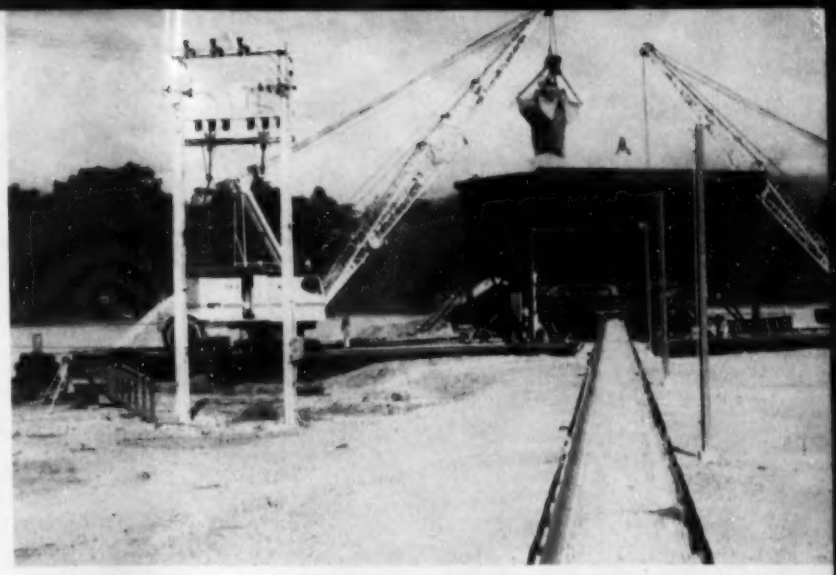
In addition to these improvements, a recent major construction project has just been completed at Paranam. While not changing the plant capacity, this project, involving the opening of another deposit across the river from Paranam, will necessitate notable changes in the flowsheet and in transportation methods. All mining operations since 1941 have been on the west bank of the Suriname River with direct access by rail or road to the Paranam plant.

From the new Rorac mining location across the river and five miles downstream, it now becomes necessary to transport crushed ore by 1,000-ton flat-deck barges, towed by Diesel tugs, from Rorac to Paranam. A new crushing and washing plant, together with barge-loading facilities and supporting service installations, has been completed at Rorac, and was put into operation before the end of 1953. The necessary dock, stationary clam-shell cranes, and conveying equipment for discharging and handling the crushed ore to the kilns at Paranam were ready for

utilization when the change-over was made.

Speed Water Shipments

Such an increase in production capacity would be valueless, however, without a corresponding enlargement of water transportation capacity, and it is here that perhaps the most striking advances have been registered in the recent post-war period. Formerly, upper Cottica River conditions limited the size of incoming vessels to small freighters capable of taking cargoes no greater than 3,000 to 3,500 tons, and these had to be turned several miles downstream from Moengo and towed stern-first to the plant. To bring the shipping capacity up to the higher level contemplated for the production capacity, it was necessary to undertake an extensive dredging program which included not only the relief of bends and elimination of shallow spots in the river, but also the digging of a turning basin at right angles to the stream adjacent to the new calcining plant. As a result, 10,000-ton vessels can now, with the help of two new and larger Diesel tugs, navigate safely all the way to Moengo. A second wharf and ship-loading set-up constructed alongside the new turning basin makes possible the simultaneous loading of two such vessels to the extent permitted by the depth of the water over the river and outer bars at high tide. Two specially designed shallow-draft ore carriers have already been placed in this service, and additional units are under construction. To provide closer control over these expanded shipping activities, two-way radios have been installed on all tugs and at two locations on shore.



WASHED ORE from the Rorac mine is unloaded by these electric-driven cranes at the Paranam Works. The conveyor belt in foreground transports the ore to plant. These new facilities were placed in operation in 1953.

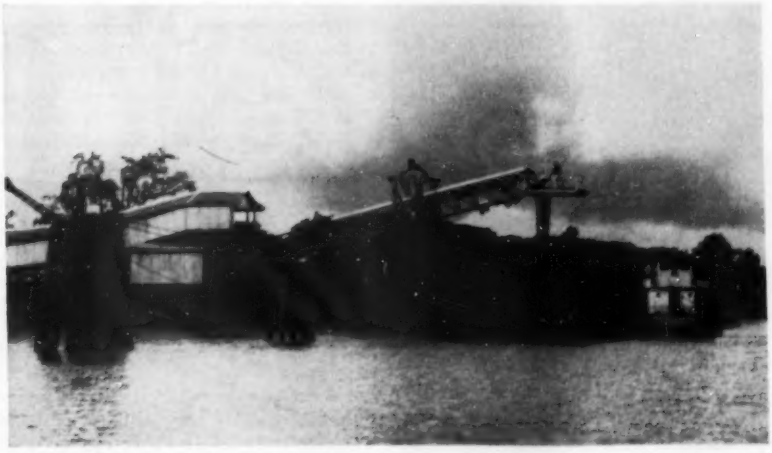
Auxiliary Facilities

To support and keep pace with these increased production and shipping operations, many of the auxiliary services have required considerable augmentation. Two new 1,000-horsepower Diesel-generator units have been added in the powerhouse, and the intra-plant communication systems, both telephone and walkie-talkie radio, have been extended. A sizeable housing construction program for both staff and workers is nearing completion, and farm and dairy operations have been enlarged in scope and output. Appropriate additions in space and newest-type equipment have been made in the machine, electric, and woodworking shops, stores, schools, and recreational facilities. The important factor of health has likewise received closest attention through the introduction of plant-wide chest X-ray, dental, and inoculation programs, broad scale use of DDT, and the importation of medical experts to advise on latest treatments for tropical diseases.

Discoveries Assure Long Life

Since the time when the known deposits on the west bank were nearing exhaustion and the move downstream was started, the company's geological department has discovered additional reserves on the west bank. These will be developed as future demands indicate.

These expansion and improvement programs at the Moengo and Paranam plants have enabled Alcoa's subsidiary, Surinaamsche Bauxite Maatschappij, so far to continue to hold an important position in the ever-growing United States bauxite supply field, despite increasing competition from many localities in the Caribbean and elsewhere. Assuming that technological progress in Surinam can continue to keep pace and that other competitive factors remain in line, it is reasonable to suppose and to predict that Surinam will occupy a place of considerable prominence in the United States bauxite supply picture for years to come.



LOADING ORE BARGE on the Surinam River near the Paranam Works. The ore has been mined at the new Rorac mine on the river's east bank and is barged across the river to Paranam in barges towed by the Diesel tug "Rorac" for processing.

SANTA FE OPEN PITS ALL THE WAY at its New Mexico uranium mines. This aerial picture of Poison Canyon shows how the railroad company's mining subsidiary—Haystack Mountain Development Company—strips all waste before mining.

How Santa Fe's Haystack Uranium Co. Plans and Schedules Uranium Mining

The Atchison, Topeka and Santa Fe Railroad Company operates its uranium mines with the same accurate scheduling, precision engineering, and long-range planning that it does its crack "Super Chief" streamlined trains.

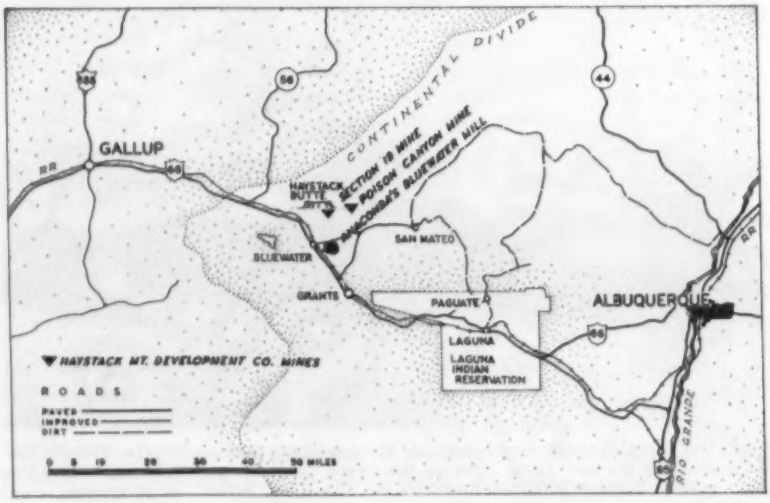
Exploration drilling well ahead of mining, waste stripping to completely expose an ore body before it is mined, and stockpiling of large tonnages of several grades of ore in blending piles—these features make the Santa Fe mining operations unique in the uranium industry.

It is all part of a well-planned program started shortly after Paddy Martinez, a Navajo Indian sheep herder, discovered uranium in July 1950 in the Todilto limestone at the south end of Haystack Butte near Grants, New Mexico. The discovery was on Section 19, T. 13 N., R. 10 W., which was owned by a Santa Fe subsidiary, Santa Fe Pacific Railroad Company. Exploration and mining operations were consolidated under a new company, Haystack Mountain Development Company, and have been directed since the start by T. O. Evans, Santa Fe mining engineer. A description of this early prospecting was described in the April 1951 issue of MINING WORLD, pages 37 and 57.

Test pitting and long hole dry drilling on a definite grid pattern have delimited 33 separate ore bodies on six different sections of Santa Fe land to date. Drilling is being continued on a definite schedule and unknown ore bodies are continuing to be found.

Exploration Methods Change

There has been a significant change in exploration drilling in the four years of prospecting. Initially, hand held



jackhammers were used; these were followed by half track mounted wagon drills which, in turn, have been supplanted by truckmounted rotary air-blast drills. At first the average depth of hole was only 20 feet. It cost $2.00 per foot to drill, and between 80 and 100 feet of hole were drilled per machine shift. Today average hole depth is 100 feet. Costs per foot have been reduced (under contract) to 45 cents for non-sampling and 60 cents per foot with sampling. One drill will average at least 400 feet of hole per day, including moving time for the several holes. Another important advantage of today's drilling is that a sample some five times as large is obtained.

Section 19, R. 10 W. Mining

Mining of Todilto limestone gangue ores started on Section 19 shortly after the United States Atomic Energy Commission's Bluewater ore purchasing depot was opened in June 1952 10 miles from the mine. This purchase depot is operated by the Anaconda Copper Mining Company which also operates a carbonate leach uranium mill treating Santa Fe and other limestone ores. (See MINING WORLD, August 1954, pages 34 to 39.) Santa Fe ships to Anaconda under a contract based on both tonnage and average grade of ore.

The first step in open-pit mining was to remove the several feet of surface blow sand with bulldozers and carryalls. In some places the ore extended to the top of the limestone; in others several feet of unmineralized limestone were drilled, blasted, and moved to waste disposal areas well outside the limits of the ore body.

A half track mounted wagon drill, complete with Ingersoll-Rand Gyro-flow compressor, is used for drilling. Holes, in ore, average eight feet deep and are drilled on 30-inch centers. Care is used to drill holes only in ore as determined from the original test drilling and sampling program. Hole diameter is 1⅞ inches with 300 feet of hole being drilled per shift. Bits are Liddicott "throw away" type which cost 21 cents and are good for 350 to 400 feet of hole. DuPont 40 percent powder, loaded about one stick per foot of hole and detonated with millisecond electric caps, is used for breaking the ore.

Stockpile for Blending

Broken ore is loaded into a 10-ton Mack dump truck by a ¾-yard Link-Belt Speeder Diesel shovel. Through experience, the shovel runner can determine if he is loading either high- or low-grade ore, and he directs the

TRACTOSHOVEL LOADING at the Poison Canyon mine. The Haystack open pit mines are completely mechanized for fast low-cost production. Four scoops load the truck in the background which hauls the ore to blending piles outside the pit limits.

EXPLORATION DRILLING is an important and continuing part of Haystack's mining program. This is one of three Failing rotary rigs which drill a total of 25,000 feet of hole per month. More than 3,000,000 feet of hole have been drilled by the company.

HAYSTACK BUTTE, in background, with the Section 19 limestone mine below. Note orderly mining steps with waste piled at far left and right, mining area in center, and blending piles in foreground and right center. The small but equally spaced dumps in the foreground are piled next to the test pits which Haystack sunk during its exploration and sampling program.

truck driver to appropriate stock piles according to grade. These piles, adjacent to the pit, but outside the ore body area, are about 15 tons each. After a series of piles have been built, Chuck Cardwell, engineer for Section 19 mine, takes a Geiger counter and checks each pile. He then marks each pile as being either high, medium, or low-grade.

An Allis-Chalmers HD 5, front-end TractoShovel next pushes all separate piles of the same grade into one large pile. This large pile is then sampled, an assay is made, and it is ready for shipment. The final step is to ship the blended ore. This shipment blending is done by varying the number of truck loads of each of the three grades of ore in a lot. For example, three truck loads of low-grade ore, four truck loads of medium-grade ore, and one truck of high grade ore might constitute a typical lot. It may take several of these lots to make the large shipping pile. Grade of the shipping pile is thus brought as closely as possible to specifications. The Tracto-Shovel is kept busy loading the 10-ton trucks that blend large piles into shipping grade lots and also loading the 20-ton trucks that haul from the shipping piles to the purchase depot.

Section 19 in Range 10 has been the largest limestone mine but shipments have also been made from Section 31, Range 9.

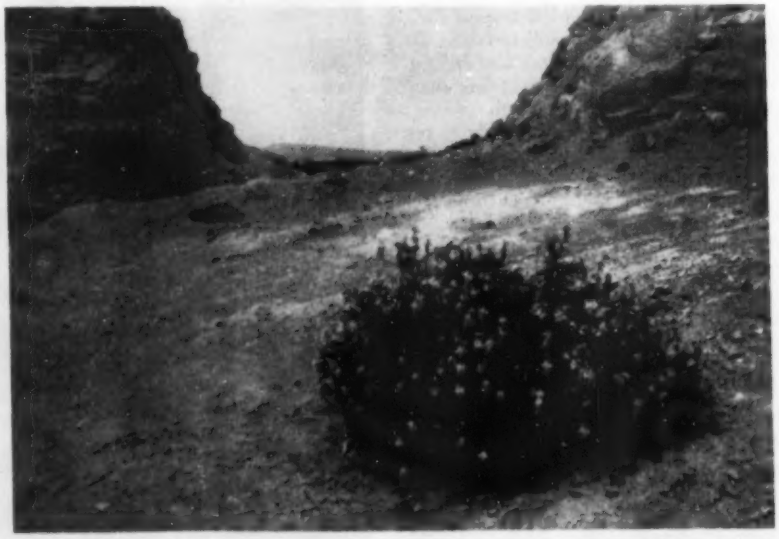
Poison Canyon

For many years the Navajo Indians had been troubled with sheep dying if they grazed on Section 19, T 13N., R.9 W, and the small canyon cutting the Morrison formation in the area was aptly named Poison Canyon.

The Morrison, most important Colorado Plateau uranium ore-bearing formation, lays on top of the Todilto and forms prominent rims north of the Todilto benches. Prospecting in Poison Canyon disclosed uranium cropping out. An extensive drilling program, with many holes on 20-foot centers, developed several large and fairly high-grade ore bodies. Selenium minerals were found to occur in association with the uranium. Next it was found that Rattle Weed, which is a selenium-loving plant, grew in soils weathered from the uranium selenium deposits. When the sheep ate these plants they soon died from selenium poisoning.

Stripping and Open Pitting

With drilling results available it was determined that the cheapest way to mine the ore was by open pitting,



RATTLE WEED led to the discovery of the Poison Canyon ore bodies. It is a selenium-loving plant which indicated uranium in the area because selenium and uranium minerals are often found together. Growth pattern approximates buried mineralization.

despite the fact that, in places, stripping depths would be up to 40 feet. A shallow canyon only a short distance south of the ore bodies offered an advantageous waste disposal area. Bids were called for the stripping of 139,000 cubic yards of waste. Daniels and Gleeson of Albuquerque were awarded the stripping contract and completed work in late 1953.

Haystack Development has since been mining the flat laying, sandstone-type uranium ore bodies. The ore is drilled with jackhammers, blasted, and loaded into trucks with an Allis-Chalmers HD 5 TractoShovel. Trucks haul out of the pit about one-half mile to three separate blending areas. Blending of Poison Canyon ore is more difficult than that at Section 19 because in addition to uranium which has to be blended to grade, the lime ($CaCO_3$) content of the ore must be kept below 6.0 percent to escape penalties. Company engineer William Burand is continually on the job to supervise blending. It should be noted that the sandstone ore will be processed in a new mill in whose circuit lime is an interfering element. This mill is now being built by Anaconda Copper Mining Company adjacent to its Bluewater limestone-gangue mill.

Ore from these blending piles, in proper proportions, is trucked to the top of a blending bin, dumped through a grizzly, and stored in the bin. The ore is then drawn from the bin into trucks which dump on shipping piles. This process assures complete mixing. An Allis-Chalmers, rubber-tired, Tractomotive, front-end loader is used to pick up the shipping stock piles and load the 20-ton trucks for hauling to Bluewater.

BLENDING PILES At the Section 19 mine. All Haystack ore is blended to uniform grade before shipment. These piles of limestone type ore have been sampled and the TractoShovel is now consolidating several separate piles which have the same grade.

Exploration Continuing

Exploration is an important and continuing part of the mining operations. Currently, three Failing truck-mounted rotary air-blast drills are operated under contract. About 25,000 feet of hole are drilled per month. All types of exploration drilling by Haystack Mountain now total in excess of 3,000,000 feet. Most recent drilling has been on Section 25 with some holes as deep as 150 feet.

Tri-cone roller bits, 3⅞ to 4½ inches in diameter, are used. The shallower the hole, the smaller the starting bit. Bits last for up to 400 feet of hole and dull bits are generally not rebuilt for re-use. Holes are uncased and all drilling below the blow sand is dry with an air blast for both cooling the bit and forcing the cuttings to the surface. Here they are caught for every two feet of hole for samples. Water is used to start the hole in sand and to form a noncaving mud collar. When the holes are finished, a scintillation probe is dropped to the bottom and radioactivity for each hole is thus logged.

At first drilling was shallow, adjacent to the outcropping Todilto along the canyon and valley rims. Today drilling is further away from the rims which means deeper holes as the beds dip about 5° to the north away from the rims.

DRILLING ORE with a jackhammer at the Poison Canyon mine. The compressor and miner are standing on ore which varies from four to eight feet in thickness and from which all waste has been stripped. Depth of waste varies up to 40 feet.

Long Time Operation

Santa Fe in only four years has become a leading independent uranium ore producer. Its pioneering work in the Grants area encouraged other prospectors and companies who collectively have developed a very important mining district.

From the company's viewpoint a very significant contribution to the atomic energy program for national defense has been made.

With 7,000,000 additional feet of prospect drilling necessary to thoroughly test the area, it is reasonable to expect that additional ore bodies will be found. Those known to date assure that Santa Fe will be in the uranium mining business for several years.

New Tax Law Will Save You Money

BY GRANVILLE S. BORDEN

This article describes the modification in the Internal Revenue Code of 1954, which directly and somewhat indirectly relates to possible tax reductions for the business of producing minerals. There are five specific modifications which deal with minerals, and four or more which have general import but are also related to the mining business.

Let us first consider the five modifications which directly concern the business of mining. The FIRST relates to the determination of the deductions from income on account of depletion measured by a percentage of income.

The rate of depletion at 23 percent of the gross income from the property formerly applied only to the mining of sulphur. This rate has been extended to uranium and "if from deposits in the United States to anorthosite (to the extent that aluminum compounds are extracted therefrom), asbestos, bauxite, beryl, celestite, chromite, corundum, fluorspar, graphite, ilmenite, kyanite, mica, olivine, quartz crystals (radio grade), rutile, block steatite talc, and zircon; and ores of the following metals: antimony, bismuth, cadmium, cobalt, columbium, lead, lithium, manganese, mercury, nickel, platinum and the platinum group metals, tantalum, thorium, tin, titanium, vanadium, and zinc."

Member AIME

Most of these metals previously had a 15 percent rate; that is, 15 percent of the gross income, limited, of course, to 50 percent of the net income from the property.

One of the most important points in connection with percentage depletion is the fact that it is allowed with respect to *ores* of the metals listed above. This is significant because many of the ores of these metals listed contain other byproduct ingredients, such as sphalerite with its sulphur, so that apparently the law will now allow percentage depletion based upon all of the gross income that is recovered from the ores of these metals. Probably, as an example, it will allow the percentage depletion to be based on a total gross income derived not only from the zinc, but also from the sulphur which is recovered from certain zinc ores and used to make sulphuric acid.

It is noteworthy that the significance and the importance of this amendment has very limited tax benefits to marginal ores. Wherever marginal ores are mined, the limitation on the percentage depletion deduction to 50 percent of the net income would apply, and the rate allowable as a percentage of the gross is immaterial.

The SECOND item of direct import to mining is the clarification of the question whether tailing dumps and residues can be considered as a part of the gross income from the property. By that I mean the revenues derived from retreating tailing dumps and residues. Heretofore, there has been much litigation over this question.

Under the new law, gross income from the property has been defined to include gross income from the waste or residues of prior mining, but the extraction must be by the mine owner or operator and not by a purchaser.

"One of the most important points in connection with percentage depletion is the fact that it is allowed with respect to ores of the listed metals."

The report of the Senate Finance Committee states that the purchaser does not include a person who acquires a whole mining property, including the waste or residue in a tax-free exchange; for example, under a tax-free corporate reorganization from a person who was entitled to depletion on the waste or residue. Nor does the term "purchaser" apply to a lessee upon the renewal of a mineral lease if such lessee was entitled to deple-

tion with respect to the waste or residue prior to a renewal of the lease.

The THIRD major change relating to mining is made by a statutory definition of what constitutes "ordinary treatment processes." These changes, however, are confined solely to expanding the scope of the ordinary treatment processes to the pulverization of talc, the burning of magnesite, and the sintering and nodulizing of phosphate rock. Also, sulphur, which has heretofore been limited to sulphur recovered by the Frasch process, where recovered by other processes, is now allowed or dis-allowed in accordance with the general provisions.

It might be worthwhile, at this point, to expand on the foregoing. As is well known, gross income is defined in the law, not only to include the operating activities within the mine and the delivery of the mineral to the surface or to the plant, but also to include ore dressing, concentrating, and other activities—generally up to the mouth of the roaster or smelter. These modifications in the definition of ordinary treatment processes are expansions of the scope of what is considered to be mining for the purpose of determining what constitutes gross income from the property.

The FOURTH item of direct import to mining is the clarification of the definition of "property." In other words, for many years there has been considerable controversy between the mining industry and the Internal Revenue Service and much litigation over this definition. What is the unit of property from which a taxpayer will determine "gross income from the property"? Heretofore, the Internal Revenue Service has been inclined to confine this word "property" to each tract or lease or, in some instances, to each claim, and these rules have been construed differently by the many Revenue engineers in the field to the end that there has been much confusion and harassment of taxpayers in determining their depletion allowances. The Congress in the Internal Revenue Code of 1954 has recognized this complexity and has permitted the taxpayer to consider each separate interest in each mineral property as a separate depletable property, but if the taxpayer elects to consider any aggregation of his several mineral interests, whether contiguous or not, in one depletable property, he may do so, provided the total group of mineral properties are confined to one operating unit.

This right to aggregate several mineral interests must be considered by every operator who mines from several different deposits and/or leases. The reason for this is the fact that the impact of the net income limitations on the allowance may have considerable influence on the operation. To illustrate, if a taxpayer had two interests in two separate mineral properties within the same operating unit (operated through the same shaft or in the same district), one of these mineral properties having high-grade ore and the other being marginal, by aggregating them the depletion allowance would be figured, for example, at 23 percent of the gross income from the combined operation. If they were not aggregated, the percentage depletion limitation would apply to the marginal property and not to the other. Percentage depletion allowance would therefore be substantially higher if the properties were aggregated. This is possible under the election which is extended to the taxpayers by this amendment.

"It is imperative that every mining organization check these provisions, and, again, minimize and pool its tax liabilities."

The FIFTH and last direct modification which relates to mining is the extension of the limitation on deductions for exploratory expenditures. In the Revenue Act of 1951 which amended the code of 1939, Congress allowed prospectors to elect to deduct all expenditures incurred in the search for minerals, and to expense the deductions currently or to consider the expenditures as deferred charges to be amortized over the life of the minerals discovered as a consequence of such exploratory activities. However, the law limited the amount of the exploration deductions to $75,000 annually. In the Internal Revenue Code of 1954 this limitation had been raised from $75,000 to $100,000 annually.

"Heretofore the mining industry has been penalized by an unconscionable obscure provision in the net loss deductions system."

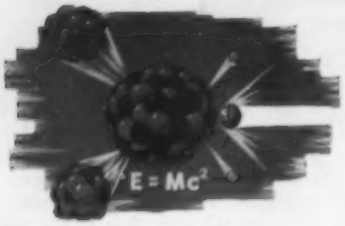
Many indirect mining benefits and modifications are also in the code. I will outline only four in their broad general terms.

The first is the modification of the depreciation allowance. Depreciation as to the property constructed and acquired prior to January 1, 1954 will be allowed at the rates which have been established heretofore, or at rates based on evidence which the taxpayer can produce. The modifications in the new law relate only to new acquisitions and property constructed and acquired after January 1, 1954. Here Congress has tried, by statutory language, to define what is conclusively presumed to be reasonable and has laid out certain formulas for computing depreciation with respect to these new aggregations. Every taxpayer is duty-bound to study the provisions of this statute to determine whether or not he shall set up different depreciation schedules for newly acquired property.

Next is the modification of the limitations on net loss, net operating loss, when carried forward and/or backward. Heretofore, the mining industry had been penalized by an unconscionable obscure provision in the net loss deductions sections; namely, that in determining the net loss carried-forward or carried-backward deduction, the taxpayer is not only obligated to reduce the net loss by the excess of percentage depletion over cost depletion for the year in which the loss was incurred, but also to reduce the net loss carried-forward or carried-backward deduction by the percentage depletion in excess of cost depletion for the year to which the net loss was carried forward.

This has worked a terrific hardship on the mining industry and it is gratifying to know that by a Senate amendment obscurely tucked away in the last days of executive session that this second reduction of the net loss reduction has been eliminated. It is no longer necessary to reduce the net loss carried-forward deductions by the percentage depletion in excess of cost for the year to which the net loss is carried.

Another modification is the option granted to all taxpayers throughout the country to either expense or amortize wholly over a 10-year period of deferred charges all of their research and development expenditures. The words "research" and "development" do not apply to mine explorations, but are confined to such research development as that relating to metallurgy, ore dressing, or mine economies other than exploration.



FISSION FACTS

Monthly Roundup of Mining News In the Atomic Energy Field

3 Shifts Drive Main Adit At Standard Uranium Mine

Standard Uranium Corporation is driving its main adit three shifts per day at the firm's Big Buck claims in the Big Indian district of San Juan County, Utah. Fast progress is being made by the crew under the supervision of Robert R. Durk, superintendent of mine operations, and Ross Ettinger, foreman.

The 7- by 8-foot adit is being driven 2,200 feet through the hanging wall Wingate formations and into and through the Chinle beds to end in the Cutler footwall beds. The ore bodies are confined to the base of the Chinle, so a series of ore passes will be driven from the footwall development drifts to the overlying ore bodies. From these ore passes open stopes with pillars will be mined in the 4° to 10° westerly dipping ore bodies.

Mining will initially be centered on Block No. 1 where 23 surface diamond drill holes have indicated an ore block of 102,754 tons averaging 9.4 feet thick. All mining will be completely mechanized using a "Gismo" which was developed and first used by American Zinc, Lead and Smelting Company at its Grandview mine in Metalline Falls, Washington. The "Gismo" will deliver to and drop ore into the transfer raises. Ore will be pulled into cars on the main level haulage adit, trammed to the surface, and trucked to the United States Atomic Energy Commission's ore buying station 40 miles away at Moab, Utah.

Equipment used in adit driving includes: Joy two machine jumbo, Model 21 Elmco RockerShovel, Plymouth Diesel motor (24-inch track gauge), and three-ton Card Grandby type side dump cars. A complete mine surface plant has been constructed at the adit portal high on the south side of Steen Canyon and 2,000 feet southwest of the Mi Vida mine.

Increased Uranium Activity Seen for Queensland Area

Uranium news from a number of companies continues to dominate reports from Queensland, Australia.

Reports of uranium occurrences in the Mount Isa-Cloncurry area are becoming increasingly frequent. Over 2,000 separate claims have been applied for. The first news, during April, came from the Glowing Hills area, 20 miles northwest of Mount Isa. Since then some airborne scintillometer surveys and considerable ground prospecting have led to a number of likely discoveries. Some reports suggest that the area as a whole may rival Rum Jungle.

One of the leading companies in this area is Australasian Oil Exploration, Ltd. More than 80 uranium leases are held near Mount Isa. The most publicized of these is the Mary Kathleen, comprising about 640 acres. This was purchased from the discoverers for £A250,000. A company to be known as Mary Kathleen Uranium Mines, Ltd. will be formed in which A.O.E. will have an 80 percent interest, with 20 percent to be held by the discoverers. Preliminary sampling indicates that the uranium minerals are principally pitchblende.

Isa Uranium Syndicate N.L. has sampling options over a number of Mount Isa leases. This syndicate represents seven Adelaide (S.A.) companies: Uranium Oxide Consolidated, Gold Mining Areas, Wolfram Hill, Cable Oil Syndicate, Ora Banda North N.L., Drilling and Development N.L., and Luxall, N.L.

United Uranium N.L. (formerly Western Queensland Uranium N.L.) is seeking uranium near Mount Isa on behalf of Northern Uranium Development N.L. and Uranium Mines N.L. Options are held on over 40 acres adjoining the Mary Kathleen area, as well as other areas eight miles northwest of Mount Isa. These are known as the Flat Tyre lode, Mother's Day lease, and Easter Egg deposit. Shaft sinking is progressing on all three.

AEC Announced Requests For Public Land Orders

Lands totaling 43,520 acres are involved in several public land orders requested by the United States Atomic Energy Commission during July.

Restored to the public domain and open for claim locations after November 12, 1954 are approximately 18,480 acres of public lands and 2,280 acres of patented lands in the Uravan mineral area of Montrose County, Colorado. This order partially revokes an earlier public land order, issued in February 1951, which withdrew more than 55,000 acres in the area from public domain.

Two land withdrawal orders were also issued. In Montrose County 12,760 acres were closed to location July 16, and in the White Canyon area of San Juan County, Utah, approximately 10,000 were ordered withdrawn. The White Canyon area is the site of the AEC's new ore-buying station, which was opened in August.

Major U-Ore Shipment Leaves Lucky Mac Claims

The first major shipment of uranium ore left Fremont County, Wyoming late in August when the Lucky Mac Uranium Corporation made a test shipment of 250 tons to the United States Atomic Energy Commission buying station at Edgemont, South Dakota. Purpose of the shipment was to get a large sample and accurate assay.

Vernon Pick Sells Rich Utah Uranium Mine To Odlum's Atlas Corporation for $9,000,000

Vernon J. Pick's Delta mine in Emery County, Utah was sold to the Atlas Corporation during the latter part of August in what was described as the Colorado Plateau's biggest uranium transaction and the largest single mine sale in the United States for several years.

More than $9,000,000 was paid for the mine, which is believed to be one of the three richest properties on the Plateau. Mr. Pick will continue as chief executive of the mine and Floyd Odlum, head of Atlas Corporation, is making plans to form a subsidiary to get the property on an estimated monthly production schedule of 10,000 tons. The mine has been producing approximately 1,500 tons per month. Plans for a mill, either at the mine site or in nearby Green River, are under consideration.

Average uranium content of the ore is 0.48 percent with some shipments as high as 3.48. Only 2.54 percent or 300,000 tons of the original ore body have been blocked out, according to Mr. Pick. The property, covering seven claims on 140 acres in the Muddy River region of south central Utah plus five other nearby claims, was discovered by Mr. Pick in June 1952.

Under terms of the sale $9,000,000 will be paid in five cash installments by the end of 1955. In addition, Mr. Pick gets $500,000 worth of Atlas stock, a $250,000 twin engine amphibious aircraft, and a salary as president of Delta Mines, Inc. during the merger period. Mr. Pick was represented by Walter Verner, Grand Junction, Colorado geologist, during negotiations. Most of the technical work was done by Gordon Babbel's Uranium Engineering Company.

A hint of the sale had come last November when Mr. Pick, who is chairman of the Colorado Mining Association's Uranium Committee, testified before the special subcommittee on minerals, materials, and fuels economics of the Senate Committee on Interior and Insular Affairs. At that time he said that under the present taxing system for uranium miners the only way he ever expected to realize the maximum value from his mine was by selling it under a capital gains plan. He reported that he found it financially impossible to mine under anything other than a limited program, despite the great need for uranium by the United States Atomic Energy Commission.

Mr. Odlum's acquisition of the Pick property brings his uranium purchases for the year to three. Last spring the firm bought 180,000 shares of stock in the Standard Uranium Corporation of Utah and 46,665 shares in Pronto Uranium Mines, Ltd., Canada. Control of another Utah firm, Lisbon Uranium Corporation, was bought by an Atlas subsidiary, Wasatch Corporation.

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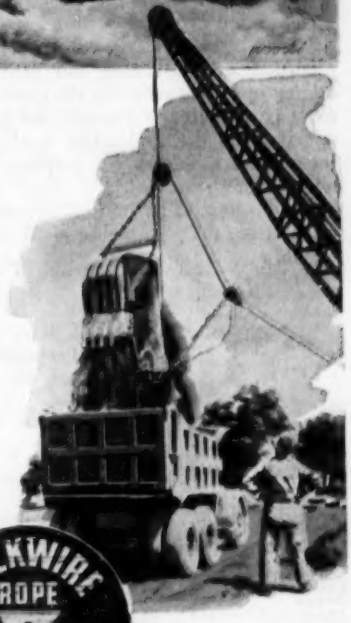

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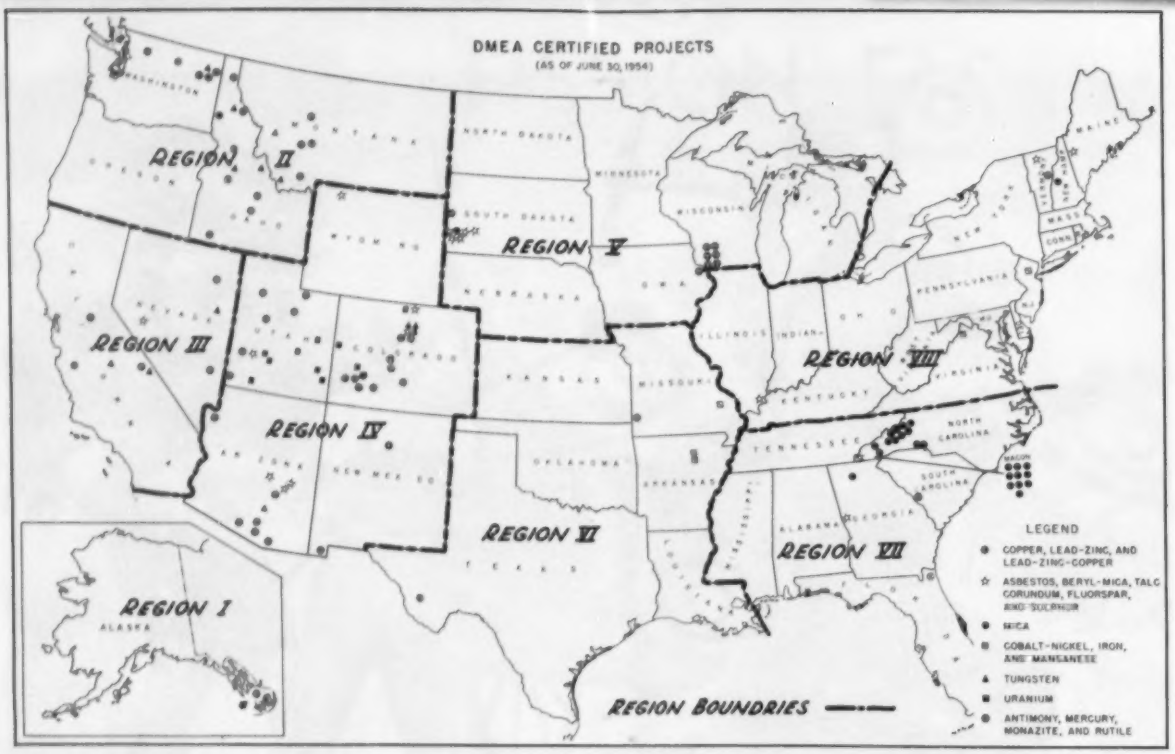


ORE DISCOVERIES have been certified in the 132 locations indicated on the above map by the Defense Minerals Exploration Administration. Ore shipments had actually been made from 109 of these mines as of June 30, 1954.

DMEA Program Proves Successful

The mine exploration program undertaken by the Defense Minerals Exploration Administration and private mining operators whereby the government participates in the cost and the operators do the exploration work at their mines is finding ore bodies and making new mines.

Take a look at the map above and you can see that ore bodies of 21 different metals and nonmetals have been found and their discovery "certified" by DMEA engineers. This means, in each case, that exploration has been successful and ore has been found. Ore reserves already indicated by the program have an estimated value in excess of $120,000,000 at current metal prices.

The tables below indicate the geographic location of all mining operators who have requested government participation in their exploration programs as well as the metal-by-metal breakdown.

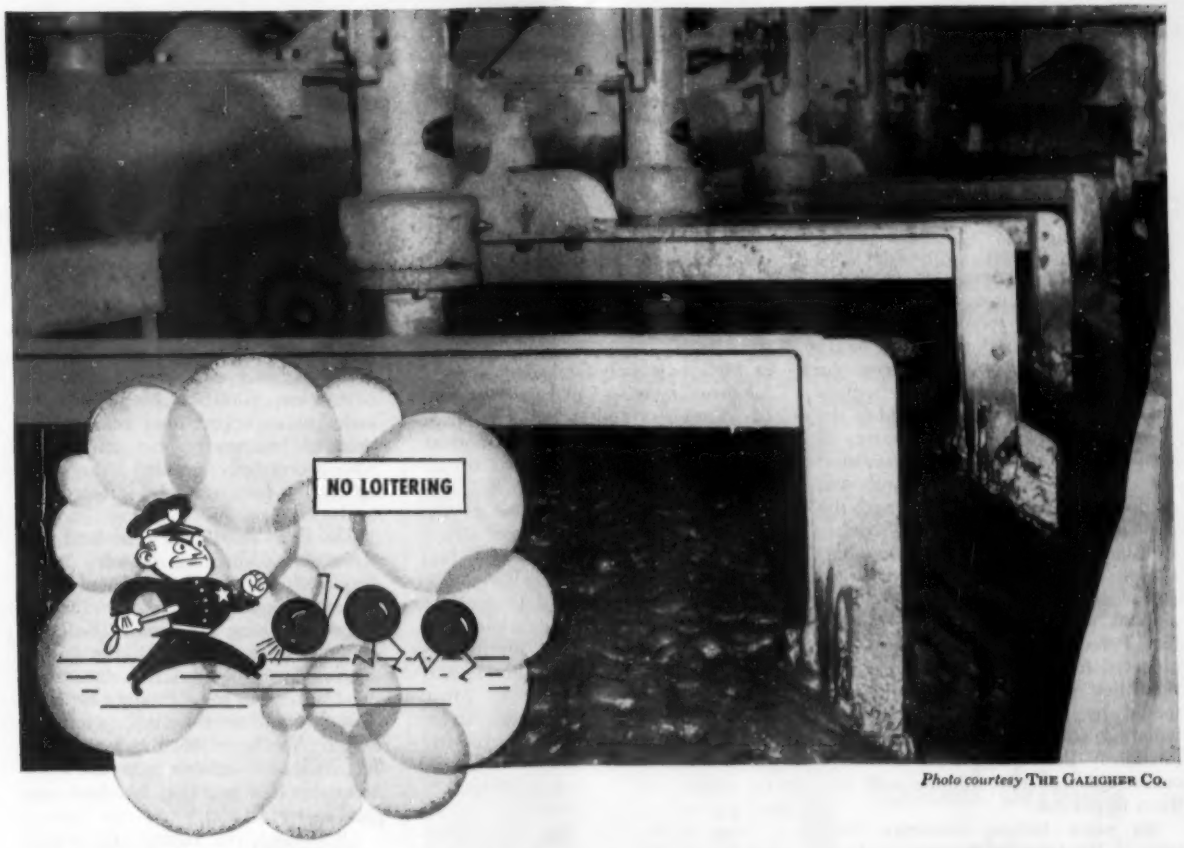
Region IV (see map) has been the busiest with 679 applications and 189 contracts. Region II had 478 applications and 161 contracts. Others are: Region III, 425 and 70; VII, 394 and 138; V, 97 and 37; VIII, 61 and 17; VI, 57 and 19; and I, 30 and 16.

State-By-State Applications to DMEA for Financial Participation Through June 30, 1954

State	Total Received	Number In Process	Number Executed	State	Total Received	Number In Process	Number Executed
Alabama	19	2	5	Montana	165	11	57
Alaska	30	0	16	Nevada	175	15	34
Arizona	162	6	32	New Hampshire	12	1	4
Arkansas	24	0	5	New Jersey	3	0	2
California	250	29	36	New Mexico	77	3	13
Colorado	248	15	85	New York	6	1	0
Connecticut	2	0	0	North Carolina	325	26	118
Florida	3	0	1	Oklahoma	3	0	2
Georgia	31	2	11	Oregon	29	2	6
Idaho	185	11	67	Pennsylvania	3	0	0
Illinois	10	2	3	South Carolina	5	0	1
Iowa	2	0	1	South Dakota	54	2	21
Kansas	2	0	0	Tennessee	9	1	2
Kentucky	2	1	0	Texas	9	0	5
Louisiana	2	0	0	Utah	161	12	56
Maine	3	1	1	Vermont	7	0	4
Maryland	2	0	0	Virginia	9	0	3
Massachusetts	1	0	0	Washington	99	5	31
Michigan	8	0	1	West Virginia	1	0	0
Minnesota	6	0	0	Wisconsin	27	0	14
Mississippi	2	0	0	Wyoming	31	4	3
Missouri	17	1	7				
				Totals	2,221	153	647

Metal-By-Metal Applications to DMEA for Financial Participation Through June 30, 1954

Metal	Total Received	Number In Process	Number Executed	Metal	Total Received	Number In Process	Number Executed
Antimony	33	1	12	Manganese	137	6	18
Asbestos	53	2	19	Mercury	46	3	20
Bauxite	2	0	0	Mica	354	31	131
Beryl-Mica	80	2	22	Molybdenum	6	0	0
Chrome	14	5	0	Monazite	22	0	5
Cobalt-Nickel	43	3	7	Platinum	5	1	1
Columbium-Tantalum	11	0	3	Quartz	6	1	0
Copper	179	8	39	Rare Earths	8	0	0
Corundum	4	0	1	Rutile	3	0	1
Diamonds	1	0	0	Sulphur	6	0	3
Fluorspar	28	4	9	Talc	16	0	1
Graphite	3	0	1	Thorium	8	1	4
Iron	28	0	4	Tin	19	1	5
Kyanite	4	2	0	Tungsten	357	30	87
Lead-Zinc	367	14	156	Uranium	210	32	60
Lead-Zinc-Copper	162	6	38	Miscellaneous	6	0	0
				Totals	2,221	153	647



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ELK CITY, IDAHO, GOLD CAMP OF THE 1860's

Fifty-two restless, disappointed men who had not found gold in Captain E. D. Pierce's newly laid out camp of Oro Fino on the North Fork of the Clearwater River (in what is now Idaho) left the diggings in May 1861 to search for gold in the hitherto unexplored upper waters of the South Fork of the Clearwater. The country was rugged and was completely strange to them and the men picked their way through dense forests and over steep mountain slopes. They followed the North Fork as far as the present town of Stites, and six miles farther on ran onto a Nez Percé Indian village. The Chief objected to their presence, protesting that they were on Indian land protected by treaty which they were violating, and that they were therefore intruders; that they were not welcome and that it would be well for them to get out.

Six years before, Governor Stevens of Washington Territory (which then included what is now Idaho) met with the Nez Percé Indians and made a treaty with them, promising them protection from white encroachment on their hunting and fishing lands. Although no trouble had materialized, the Nez Percé and other tribes were restive and hostile to any infringement of their rights. Only the Nez Percé Chief Timothy was friendly to the white men and permitted them on his domain. But this chief, whom the prospectors encountered, was not Timothy. At the chief's words, half of the party lost their enthusiasm for the venture and started back to Oro Fino. The rest went on, in spite of warnings by the hostile Indians, and grudging consent that they might enter the forbidden territory.

Following the old Nez Percé trail, the men finally came to a high valley in the western foothills of the Bitterroot Mountains. It was about seven miles long, cut by streams, and surrounded by dense pine forests and ledges of quartz. Here they made camp and began to pan the creek for colors, which when found were said to be "deeper red and coarser than those found at Oro Fino." The first gold is reported to have been located "close to where the bridge was afterwards built over the American River on the road to Dixie."

The party, which included Captain L. B. Monson, Moses Milner, and Charles Hand, began placering and were soon recovering gold, "running as high as twenty-five cents a pan." A miners' meeting was called on June 14 at which "a drawing was made for 10 placer claims on the American River." A mining district was organized and Captain Monson was elected Recorder and Justice of the Peace.

By early fall a town had been laid out between two streams—Elk Creek and American River—and because of the number of elk in the vicinity was called Elk City. The first supplies to be received were packed across the mountains by John Creighton. Meat and game were plentiful and vegetables could be bartered from the Indians. Before long Elk City had several canvas and log stores, 40 houses and a population of 2,000.

Some of the men laid in supplies and "dug in" for the winter but most of the miners went "outside" before heavy snows trapped them in the area. When they returned in the spring of 1862, thousands of other men who had heard of the rich placers at Elk City accompanied them along the rough trail.

By the end of 1862, private assay offices were casting the gold brought them into bars and shipping it to San Francisco. Old timers estimate that one freighting company packed out more than $900,000 in placer gold and that an appreciable amount was secretly transported by individuals who successfully avoided being held up by the footpads who infested the trails.

The Elk City district contained two types of gold-bearing deposits, "skim diggings" along the stream, and "bench diggings," lying in ledges higher up along the banks. The skim diggings were the richest; the bench diggings were more expensive work since water had to be brought to them in ditches or flumes. According to S. P. Jellum *(Northwest Mining News)* the first hydraulic mining was done on American Hill in 1864. "A short run produced $183,000."

All through the 1860's mining was active, but finally the placers were exhausted and the miners pulled out to explore newer gold fields, of which there were several in central Idaho. After 1872, Chinese miners came to Elk City to work the abandoned properties or to buy claims from the

Elk City, Idaho, an early gold camp which has come back with lumber and cattle activities since World War II.

few white men who remained. During this period at least 1500 Orientals successfully reworked these supposedly worthless diggings and tailing dumps, sifting the gravels two and three times until nothing of value remained. They, too, then withdrew.

The Chinese used opium and ordered it sent in by mail, disguised as cans of tobacco. During the snowbound winters all mail was packed in from Mt. Idaho, 60 miles away, and was carried on the mail carrier's back. On one such trip the mail sack held, in addition to letters and packages, several containers of opium, and with every step that the carrier made through the snow, the sharp corners of the can banged against his back and shoulders. That night when he made camp, he decided to get rid of this annoyance and pounded the locked sack with a heavy piece of wood, until the sharp edges that had been bothering him were flattened out. Throughout the rest of his 60-mile trek he received no more bruises from the cans but—opium is thick and sticky and pounding had sprung the cans and allowed the stuff to ooze over the mail. When the sack was unlocked at Elk City, the contents were cemented together into a syrupy, gummy mass and could not be delivered. No more opium arrived by United States mail!

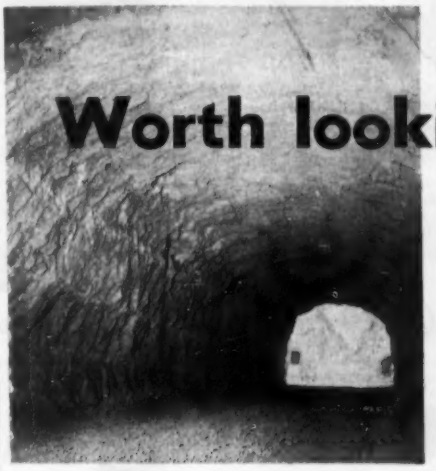
By 1890, white miners were drifting back to work the bench gravels and to search for quartz lodes. The first to be staked was the Buster mine, whose ores were soon treated in an arrastra built and operated by "Buster" Smith. Quartz mining in general flourished from the middle 1880's on. The Allamance and the American Eagle on Siegel Creek, both of which were discovered in the 1890's provided rich ores for their respective mills. The American Eagle mine closed down in 1904. Its output is estimated at $300,000. The Buster mill, built in 1907, was later "overhauled to treat ores from the Mineral Zone Mine." The Epsey produced $18,000 between 1899 and 1907. At the peak of the lode-mining boom, five mills operated in the district.

Old photographs give some idea of Elk City's appearance during the 1890's. Log cabins with roofs of shakes and false-fronted stores lined the streets. Two cemeteries received the dead, and the town even had its 'hanging tree' from which both Chinese and white men are said to have swung. After such an occasion, the bodies of the men were thrown into an old mine shaft. Grubstake Point, near Elk City, was set aside by some of the first miners in the region to be kept in perpetuity as 'open ground,' so that any man down on his luck might pan out enough gold for grub and supplies, without having to first find a location and stake a claim.

Toward the close of the 19th century Elk City was again marking time and by 1898 it was nearly deserted. Then, the discoveries in the Buffalo Hump country and at Thunder Mt. in 1901 sent a rush of men and freight through Elk City en route to the new strikes. This kindled renewed activity in the mines and resulted in a mild boom. But even it lasted but a few years.

In the twentieth century dredging companies began gouging gold from placer grounds. There has also been prospecting for strategic metals but little activity in hard rock mining. Throughout this period Elk City has remained relatively quiet. In 1945 its population was 25; in 1949 it contained 88 registered voters.

Today new industries are taking the place of mining and are bringing more people to the high mountain valley. Farming and cattle-raising have been successfully carried on for some time. Lumbering is increasing. Sawmills are operating in the vicinity, supplied by local logging operations. In 1949, an airstrip with an 1,800-foot runway was built near Elk City, and has been extensively used by the Forest Service.



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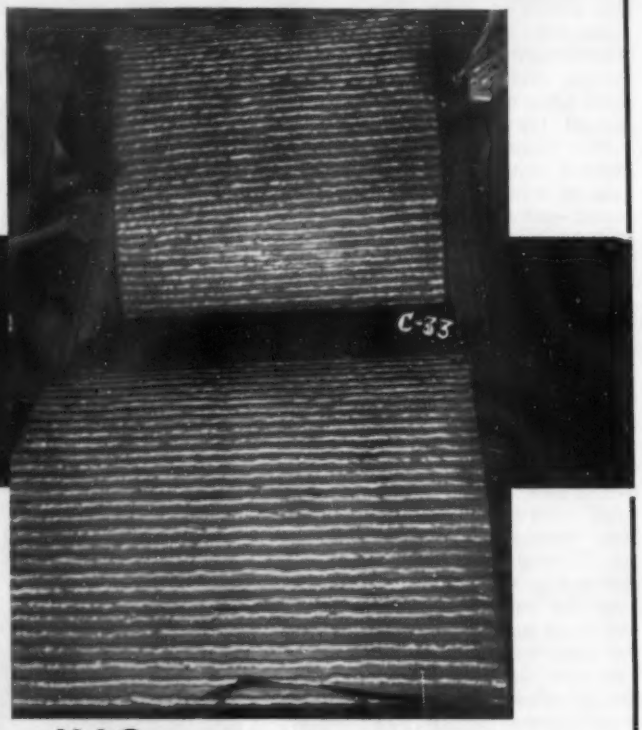

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Personalities in the News

David D. Baker, consulting engineer, is the new staff engineer for the Exploration Division of the United States Atomic Energy Commission at Grand Junction, Colorado. A veteran of nearly three decades in the mining and metallurgical industries, Mr. Baker was recently manager for the Utah Construction Company in Korea during completion of a contract with the Korean Government for rehabilitation of tungsten mines in that country.

Walter Henry Steinke, veteran Kennecott Copper Corporation employee, retired as general mill foreman at the Ray, Arizona division recently.

Gordon Dean, former chairman of the United States Atomic Energy Commission, is chairman of Nuclear Science & Engineering Corporation, a new Pittsburgh, Pennsylvania company which will provide technical services to firms engaged in developing nuclear power. A substantial portion of the capital stock for the company have been subscribed by American Metals Company, Ltd. and Ketay Manufacturing Company, New York. Directors of the enterprise include Dr. **Glenn T. Seaborg,** University of California professor, co-discoverer of plutonium, and a former member of the AEC advisory committee; **Manson Benedict,** Massachusetts Institute of Technology professor and former chairman of the War Department's technical committee on the control of atomic energy; **Freeman H. Dyke,** American Metal; **Morris F. Ketay,** president of Ketay; and **William H. Osborn,** Lehman Brothers.

Richard N. Hunt, vice president and chief geologist of the United States Smelting, Refining and Mining Company, Salt Lake City, Utah, has been named to the board of Hecla Mining Company, Wallace, Idaho.

JOE AND RUDY RUNDBERG, a father and son prospecting team who recently discovered a uranium deposit near Austin, Nevada, have leased the property to a group of Tonopah, Nevada businessmen, the Uranium Mines, Inc., for a 20-year period. The property, covering seven claims, is in the Austin mining district on the west slope of the Toiyabe range, five miles southwest of the small town of Austin. The discovery is reported to have attracted many prospectors to the area.

W. PAGE MORRIS, resident manager of Duval Sulphur & Potash Company's mine and refinery at Carlsbad, New Mexico, has been named vice president and assistant general manager for the firm. He was transferred to the company's headquarters at Houston, Texas September 1. Mr. Morris is completing his second year as president of the New Mexico Mining Association. Succeeding him at Carlsbad is GEORGE E. ATWOOD, formerly refinery superintendent and assistant resident manager.

Howard Waldron, president of Dynamic Engineering, Inc., Salt Lake City, Utah firm, has accepted a professorship in mining engineering at the University of North Dakota. Prior to forming his own business in Salt Lake City, Mr. Waldron was New York district manager for MINING WORLD.

Percy S. Gardner, Jr., former superintendent of the Silver Dollar mine, east of Kellogg, Idaho, has become associated with Frank Eichelberger & Associates, Spokane, Washington engineering firm. Mr. Gardner is the inventor of a hydraulic ore hoist which he installed at the Shullsburg, Wisconsin zinc mine of the then Calumet and Hecla Consolidated Copper Company.

Among new staff members at the Climax Molybdenum Company, Climax, Colorado, are **Paul A. Childress,** who recently joined the engineering department, and **Raymond M. Stewart,** planning department. Transferred to the geology department was **Robert A. Navias.**

Kenneth C. Vincent, formerly chief metallurgist with the Baroid Sales division, National Lead Company, heads the new ore dressing section of the Armour Research Foundation. The new research section will be concerned with beneficiation of both non-metallic and metallic ores. Named supervisor of the Research Foundation's geology and mineralogy section, formerly known as the minerals section is **J. Scott Griffith.** Mr. Griffith has been with the foundation since 1941. Supervisor of the chemistry of mineral products section, formerly the inorganic technology section, is **Samuel W. Bradstreet, Jr.**

Peter Robertson, formerly assistant vice president in charge of operations, has been named vice president in charge of planning and development for Republic Steel Corporation. He succeeds **E. M. Richards,** who has retired.

Hugh A. Gerst, formerly with the Tennessee coal and iron division of United States Steel Corporation, has been named a mine foreman by the Florida Phosphate Minerals Division, International Minerals and Chemical Corporation.

W. E. Holliday, Oliver Iron Mining Division, United States Steel Corporation, has been appointed chief chemist for the Hibbing-Chisholm district operations. He has been assistant chief chemist in Hibbing, Minnesota.

R. H. Graham, head of Graham Oil Company and vice president of Silver Dollar Mining Company, was elected president of the Gladstone Mountain Mining Company in Spokane, Washington.

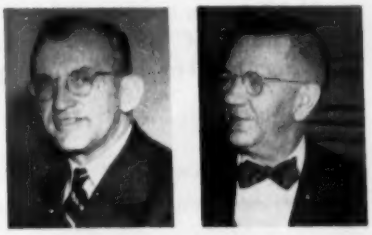
Wallace Kelly, Salt Lake City, Utah mining man, is president of the newly reorganized Lakeside Monarch Mining Company. Other officers of the Utah firm are **Hubert Wolfe,** vice president, and **Louis D. Tannenbaum,** secretary-treasurer.

Max W. Lightner, newly appointed assistant vice president in charge of research and technology, has named five staff members to this division of the United States Steel Corporation. The new appointees are **John G. Zimmerman,** who will serve as manager, and directors **Robert B. Mears, Saylor C. Snyder, David L. McBride,** and **Charles A. Bishop.**

William A. Harrigan, Nevada mining man, has been appointed superintendent of mines for New Park Mining Company, Salt Lake City, Utah.

J. W. McAllister, Colorado Fuel & Iron Corporation employe for more than 30 years, has been named administrative assistant to the president. He will continue to maintain offices at Denver, Colorado.

George T. Harley, for 10 years manager of International Minerals and Chemical Corporation's potash mines at Carlsbad, New Mexico, retired July 1. Mr. Harley plans to engage in private practice as a geological and mining consultant. With International since 1940, he has also been a professor of geology and mining at New Mexico School of Mines.



OSCAR A. GLAESER (left) recently was named vice president and general manager of western operations for United States Smelting, Refining and Mining Company. W. C. PAGE, (right) who has held this position for several years, was appointed vice president and consulting engineer. Mr. Glaeser has served as assistant general manager of operations since 1952. Before coming to United States Smelting in 1936 he was associated with Kennecott Copper Corporation, Pacific Coast Coal Company, and United Verde Copper Company. Both men will continue to make their headquarters in Salt Lake City, Utah.

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The J. R. Simplot Company's Fertilizer Division, Pocatello, Idaho has announced two appointments. **Bob Long**, formerly with International Smelting & Refining Company at Toole, Utah, has accepted the position of mechanical superintendent. **Oscar C. Finkelnburg**, formerly with Anaconda Copper Mining Company, has accepted the position of assistant production superintendent.

Lloyd M. Scofield, mining geologist, has announced the opening of a consulting office in Duluth, Minnesota.

Thomas B. Copeland, Grand Junction, Colorado, was elected chairman of the board of directors of Colonial Uranium Company. The company is planning to construct a thorium mill near Gunnison, Colorado, according to president **Robert Ludwig**.

Three new engineers at the Carlsbad, New Mexico, Potash division, International Minerals and Chemical Corporation are: **Howard L. Moore, John M. Petkovsek**, and **Carlos O. Rodriguez**.

Paul T. Benson, who retired as general superintendent of the Tacoma smelter, is now consultant for White Pine Copper Company.

OBITUARIES

John Mills Hoff, Sr., 62, former president of the Willow Valley Mines Company in Nevada City, California, died July 22. He had retired from his presidency only a few months before his death, and for many years was a key figure in the operation of the Murchie Mine.

Alex Ranson, 83, Nevada mining man, died early in July in Reno, Nevada. A well-known developer of mining properties in the state, Mr. Ranson was the original discoverer of the extensive gypsum deposits at Empire in northern Washoe county in 1907.

Stephen Royce, 65, chief geologist for Pickands Mather & Company, died June 10 in Boston, Massachusetts. Active on the Iron range for the past 35 years, Mr. Royce's geological expeditions had extended from Labrador to Arizona. He was the author of many mining articles published both in the United States and England.

W. A. Prendergast, 87, president of the New York and Honduras Rosario Mining Company since 1918, died during June in New York City. In addition to his mining activities, Mr. Prendergast was well-known in financial and railroad circles.

Seton S. Williams, consulting mining geologist and engineer of Tucson, Arizona, died May 26. Mr. Williams had done extensive work in ventilation and dust control and during 1940-41 was employed by the Arizona Department of Mineral Resources to survey and study dust conditions in Arizona mines. His report was used largely as the basis for the state's occupational disease law. In recent years he specialized in consulting work for small mines.

W. R. Hamilton, 73, retired mining engineer, died May 4 at Salt Lake City, Utah. He was active in mining circles in the Boulder and Cripple Creek areas of Colorado.

Newsmakers in International Mining

GORDON I. GOULD, international authority on mercury, has returned to San Francisco, California from an extensive survey trip through Europe in connection with consulting work. His itinerary included visits to the Almaden mercury mine in Spain and the Monte Amiata property in Italy. Mr. Gould has designed and built plants incorporating complete furnace and condensing units and is well known as a mercury operational consultant throughout the Americas.

T. E. Sapp, underground shift boss for the Balatoc Mining Company, Baguio, Philippine Islands, has resigned and taken a new job on the island of Guam.

Two German potash mining authorities from Kali-Chemie, Hannover, **Bergwerksdirektor H. Kotter** and **F. Bessert,** have been touring mining operations in the United States. While in Carlsbad, New Mexico, they showed particular interest in hoisting equipment and continuous miners at the International Mineral and Chemicals plant, since they plan to install similar equipment in Germany.

W. Huber, geologist for the Eastern Mining and Metals Company, Ltd., Singapore, is on his way to Switzerland from Malaya where he has been studying iron ore operations for the company. Dr. Huber has been visiting the United States on his way to Europe and has toured several iron ore mines on the Mesabi Range.

J. V. Harrison, professor of geology at the University of Oxford, is now on his fifth geological expedition to Peru. Included in his current program are geological exploration of the Andes between Huancayo and Chincha and between Morococha and Oroya, revision of the geological survey work carried out last year between Junin and Pasco, and continuation of a geological survey of the Central Andes. His work is in cooperation with the Peruvian Institute of Geology and other organizations.

Mario Camacho Castro and **Abraham Tellez Rocha,** both of the National Institute for the Investigation of Mineral Resources in Mexico, have been awarded scholarships by the Institute of Inter-American Affairs. They have begun their mining geology studies at Stanford University in California. The two engineers are graduates of the University of Guanajuato.

G. G. Hatch and **Jack Van Winkle,** Quebec Iron and Titanium Corporation, Quebec, recently toured the Iron Range area of the central eastern United States observing plant operations in the region. Dr. Hatch is director of research for the Canadian firm and Mr. Van Winkle is the company's chief engineer.

Harry T. Bellamy, refractory specialist from the Armour Research Foundation, Illinois Institute of Technology, has been sent to Pakistan to assist in the production of refractory brick at Malakwal. Mr. Bellamy will serve as refractory technologist to the North Western Railway of Pakistan, owner of the plant. His assignment is under the auspices of the Foreign Operations Administration's foreign aid program.

A. G. Mowry, general mine foreman of the Itogon Mining Company, Baguio, Mountain Province, Philippine Islands, is in Palawan Island directing the development of the firm's cinnabar mine there.

Satyabrata Ray, who has a New Jersey Zinc Company research fellowship at Lehigh University in Pennsylvania, has been working for the company during the summer in Platteville, Wisconsin. Mr. Ray is from Calcutta, India.

D. D. Stitt has been appointed consulting metallurgist to the central mining group of Rand Mines, South Africa.

C. E. BARTLETT, former director of milling operations for Combined Metals Reduction Company with headquarters in Salt Lake City, Utah, has been assigned by the U. S. Bureau of Mines as a Point Four consultant to Cuba. Working with the Agricultural and Industrial Development Bank (BANFAIC), he will supervise the installation of a minerals investigation laboratory in Cuba. At the laboratory technicians will assay Cuban rocks and minerals to determine means of concentrating low-grade ores. Mr. Bartlett expects to be on the assignment for two years.

Arthur Nelson, former superintendent of the Morning mine, Mullan, Idaho, has been appointed general manager of the Minas de Matahambre, Cuba. He had been assistant general manager for about a year.

Percy Scott Hammond, director of De Beers Industrial Corporation, Western Reefs Exploration & Development Company, and East Daggafontein Mines, all with offices in Johannesburg, South Africa, has succeeded **S. R. Fleischer,** who recently resigned his directorship.

Essington Lewis, Australian mining figure, has been awarded the gold medal of the Institution of Mining and Metallurgy in London, England, for his "long and distinguished service to the mining and metallurgical industries of Australia."

Geraldo Melcher, mining engineer, is currently on the staff of a geological project in the Ribeira Valley river area in Brazil. This region is noted for its significant deposits of phosphates, galena, and sphalerite.

P. H. Jamieson is the new manager of the Northern Territory section for Enterprise Exploration Company Pty. Ltd., Rum Jungle, Australia.

F. A. Green, works manager, Broken Hill Associated Smelters Pty, Ltd., Port Pirie, South Australia, is in England studying developments at the Imperial Smelting Corporation Ltd., Avonmouth.

J. B. Tyrrell, president of the Kirkland Lake Gold Mining Company, Ltd., Ontario, Canada, has resigned after 23 years in the position. Succeeding Dr. Tyrrell, who remains with the company as a director, is **V. H. Emery,** formerly vice president and managing director. Elected vice president was **W. S. Walton,** a director for the firm. **N. S. Beaton** is the new managing director.

Juan Lechin, Bolivian mines minister, and the manager of the Bolivian Mining Corporation have left La Paz for Germany and Belgium. It is reported that the trip is in connection with the possible purchase of furnaces for a tin smelter.

B. Grun, until recently manager of the Mineral Recovery, Ltd. operations in Cornwall, England, has been appointed mill superintendent for Pahang Consolidated Company, Ltd. in Malaya.

F. Struan Anderson, director and group mining engineer for Consolidated Zinc Pty. Ltd., Australian mining firm, is on a three-month visit to England, Canada, and the United States.

Edward Steidle, dean emeritus of the College of Mineral Industries at Pennsylvania State University, has returned from a two-month assignment in Turkey. The trip, at the request of the Turkish government, was to evaluate the government's Mining and Research Institute. Commenting that Turkey is highly mineralized but as yet undeveloped, Dr. Steidle has recommended the establishment of a mineral industries college and research institute to spearhead mineral education and study in the Middle East.

Oswaldo Pessoa, Brazilian mining engineer, is in charge of the operations of Industria e Comercio de Minerios near the Serra do Navio manganese deposits, Amapa, Brazil.

F. W. R. Godden, director of Cluth Development, Ltd., has retired as managing director of Bulolo Gold Dredging, Ltd., British Columbia mining firm with operations in New Guinea.

VICTOR B. COSTER, for many years associated with Westinghouse Electric International Company's import division, and more recently president of Overseas Raw Materials Corporation, is now with E. A. Godoy & Company, Inc. of New York, sales agents representing mining companies in the United States and other countries.

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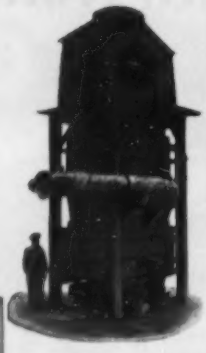

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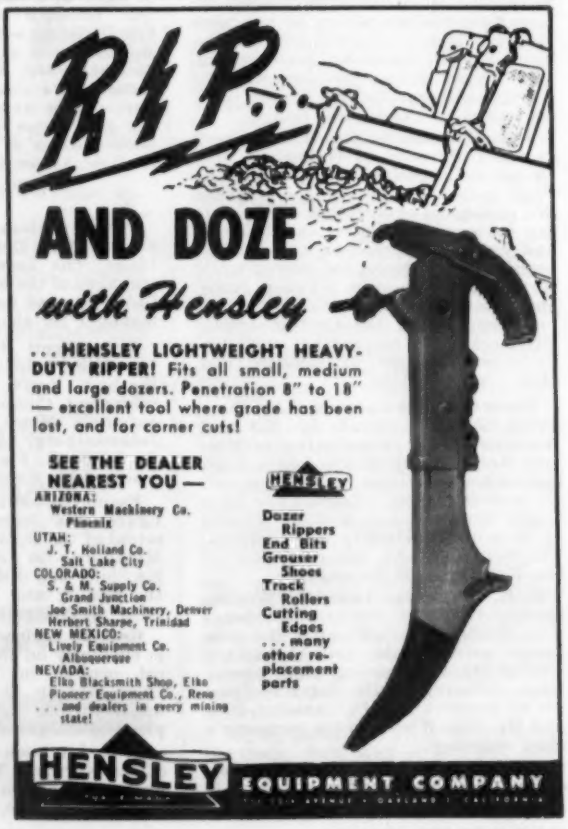

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Frobisher Gets Go-Ahead on Power Project To Industrialize British Columbia Coast Area

The $700,000,000 metallurgical project planned for the British Columbia-Yukon area by Frobisher, Ltd., Canadian subsidiary of Ventures, Ltd., has been given the go-ahead by the British Columbian and Canadian Federal governments. Water rights to the southern part of the Yukon River drainage basin have been granted Quebec Metallurgical Industries, Frobisher subsidiary, through its subsidiary Northwest Power Industries, Inc. (See MINING WORLD, April 1954, page 61.) This permission opens the way for a development program designed to turn the British Columbia coastal wastelands into the site of a thriving metallurgical industry.

The project initially calls for three dams which will reverse the flow of part of the waters of the Yukon and divert them into a 2,200-foot elevation watershed extending 200 miles north and south and 300 miles east and west. From here the water would be carried down through Lake Atlin and through several mountain-spanning tunnels to a generating plant near Tulsequah. Forty-five mile long transmission lines would take the power to the proposed processing plants at the shores of the Taku River, near the Alaska Panhandle border.

Officially called the Yukon River-Atlin Lake-Taku River Power Project, the major metallurgical objectives of the plan are:

1. Treatment of nickel-cobalt ores and concentrates from New Caledonia, the Philippines, and other Pacific Ocean Islands.
2. Smelting of Pacific Coast iron ores and concentrates for the production of pig iron and steel. Large iron deposits are available on Vancouver Island and elsewhere in British Columbia and at Klukwan in southeastern Alaska.
3. Production of ferromanganese and silicomanganese.
4. Treatment of zinc and other base metals available in the Pacific area of Canada.

Initial emphasis will be placed on the first three plans. By 1956 it is expected that two pilot plants for pig iron and steel and cobalt-nickel production will be built in Vancouver. Later, bigger plants will be constructed to the north.

Included in future plans is an aluminum project in which Reynolds Metals Company, an American firm, reportedly has an interest. It is said that the Frobisher-Reynolds plant will rival in size the Aluminum Company of Canada development at Kitimat, B. C. The Aluminum Company of America had honed to harness the Yukon waters for the United States Alaskan project at Taiva, and it had been carrying on a keen rivalry with Frobisher for the water rights in the area.

The Vancouver pilot plants are expected to be well in operation by 1956, with the Frobisher project in production by 1962. Production from the pilot plants in 1956 is estimated as: cobalt, 1,020,000 pounds; nickel, 480,000 pounds; iron and steel, 35,000 tons. By 1962 production goals at the larger plants are expected to be: cobalt, 3,720,000 pounds; nickel, 80,480,000 pounds; iron and steel, 210,000 tons; and manganese alloys, 160,000 tons.

The 1962 objective calls for a capital outlay (in metallurgical plants) of $52,000,000, and $212,750,000 for development of 880,000 horsepower for daily treatment of 5,500 tons of cobalt-nickel ore, daily production of 550 tons of iron and steel, and 450 tons of manganese alloys.

Union Carbide Studies Angola Mineral Deposits

The Union Carbide and Carbon Corporation of New York has carried out a large-scale mineral search program in Companhia Mineira do Lobito's mineral concession in Angola. The concession area has 48,000 square kilometers and is bounded by latitudes 12, and 14 degrees and longitude 14 degrees 30 minutes, and 16 degrees 30 minutes. A tot l of 34,500 Contos was spent during the first year of field operation.

Several occurrences of gold, monazite, iron, and of radio-active substances have been located but it is too early as yet to estimate their importance.

Investigated also were the copper occurrences of Caquete and the tin and tungsten deposits of Ganda in the concessions which were, in part, already investigated by Companhia Mineira do Lobito in 1952.

New Firm To Reopen Old ASARCO Mexican Property

A new company, the Impulsora Minera de Angangueo, headed by David Contreras Castro, Francisco Chavez Gonzalez and Agustin Arriaga Rivera, has announced early reopening of the various properties worked for more than 50 years in Angangueo, Michoacan State, Mexico by the American Smelting and Refining Company.

The mines have been shut down since May of 1952 when a fire in the La Dolores unit resulted in the death of more than 20 workers and caused damages so extensive the management decided to give up its concession. Since then once-prosperous Angangueo has become a ghost town and some 4,000 of its 11,000 inhabitants have left for other parts.

The mines' reopening is reported to have been made possible through an agreement with the Michoacan Railway Company, British owner of the property. American Smelting is cooperating by drawing up an inventory of its equipment for evaluation by the Nacional Financiera, government credit agency. It is believed the new enterprise will receive Federal and State government aid.

National Gypsum Begins Canadian Development

The National Gypsum Company's estimated $6,000,000 development of its new Nova Scotia gypsum deposits, reportedly the largest yet discovered in North America, will be ready for full-scale mining operations by the spring of 1955. Construction of mine and dock facilities are already under way.

The Halifax development is a part of the firm's four-year, $37,000,000 expansion program scheduled for completion by mid-1958. The company is also expanding capacity at its gypsum products plants in New York, Baltimore, Maryland, Savannah, Georgia, and Portsmouth, New Hampshire by 25 percent at an estimated cost of $3,500,000.

The Halifax deposit was discovered and proved two years ago by National Gypsum geologists. At the town of Milford, 30 miles from Halifax, a railroad bridge and necessary buildings and equipment at the quarry site are being built. Overburden is being stripped. At Dartmouth, across the bay from Halifax, construction has been started on docks large enough to receive 12,000-ton ships. Cranes, conveyors, and other facilities capable of loading a ship in four hours are under construction. The dock project is located on a three-mile extension of the Canadian National Railroad.

The development is being supervised by the firm's Engineering Department under the direction of S. David Skinner. The engineering has been assigned to the General Engineering Company of Toronto. General contractors are Foundation Maritime Ltd. of Montreal and Halifax at the mine, and Grant Mills Ltd. of Montreal at the docks.

1954 Outlook Favorable For Austrian Mining

An over-all increase in production has been reported for nearly all phases of Austria's mining industry during the first six months of 1954.

Although iron production was halted for approximately three weeks in the early part of the year because of extreme weather conditions, production was 1,293,190 metric tons or only 50,380 tons less than the comparable 1953 period.

Production for the first half of 1954, showing an increase over 1953, was as follows (in metric tons): copper ore, 85,219; magnesite, raw, 402,385; sintered magnesite, 130,663; caustic magnesite, 43,707; bauxite, 7,006, and graphite 7,819.

The outlook for copper and lead-zinc production is considered good, because of an increasing domestic demand. The 10,000-ton zinc smelter under construction at the Bleiberger Bergwerks Union at Gailitz is expected to be completed next year, making possible the domestic processing of Austrian zinc ores. An active search for unknown deposits has disclosed zinc-lead deposits with zinc to lead in a ratio of 3:1 or 4:1. These were found near Lafatch, Tirol.

French Moroccan Lead Deposits Being Explored

Exploration work started a few years ago in French Morocco has led to the discovery of two lead deposits which are now meriting further attention.

The first one, Tissili n'Roumi, is being explored by Societe Miniere de KSIBA. The second, Djebel Khetem, is owned by the company formed by the Bureau de Recherches et de Participations Minieres and Hadj Omar Sebti. Production at the latter will start after the construction of a washing plant.

INDIA—The Indian government has approved the abolition of the 15 percent export duty on manganese ore. The Madhya Pradesh Mineral Industry Association was one of those strongly urging such action because of the closing of so many manganese mines in that state. (See MINING WORLD, August 1954, page 59) It is expected that renewed buying will result from the action.

MALAYA—*Bukit Tupah Rubber Estates Ltd.* has granted permission to prospect on fairly large areas of its property in Kedah for tin and iron ore. Last year the company sold 80 acres for mining operations but only 34 acres have actually been taken up by the purchasers because of lack of funds. Completion of the sale of this area is held up pending issuance of a mining license by the state government. An option on another 313 acres has not been taken up because of the low quantities of tin on the land, but the management expects more interest in the property when the price of tin rises.

BURMA—Lead-zinc ore production at *Burma Mines Ltd.* has risen steadily during the last three quarters. Quarterly totals for the periods ended September 30, 1953, December 31, 1953, and March 31, 1954 were: 17,800 tons, 18,435 tons, and 23,131 tons. To meet the urgent need for more skilled underground labor the Burmese government has sanctioned the recruitment from India of a further 300 Gurkha miners. At Mansam Falls, hydroelectric generating station No. 4 generator (4,000 kw) was successfully brought into commission, bringing the total rehabilitated capacity of the station to 8,000 kw. in preparation for the projected increased milling capacity now planned.

PAKISTAN—The country's first major fertilizer plant is under construction at Daud Khel in Multan district, adjacent to the gypsum deposit of the same name. The £4,500,000 project is partially financed by the United States Technical Cooperation Administration. The Pakistan Industrial Development Corporation will will take over its operation, presently scheduled for 1956. Output will be about 50,000 tons per year; of this, a large proportion is to be ammonium sulphate produced directly from gypsum. Consumption of gypsum is expected to be about 200,000 tons annually containing 37,000 tons of sulphur.

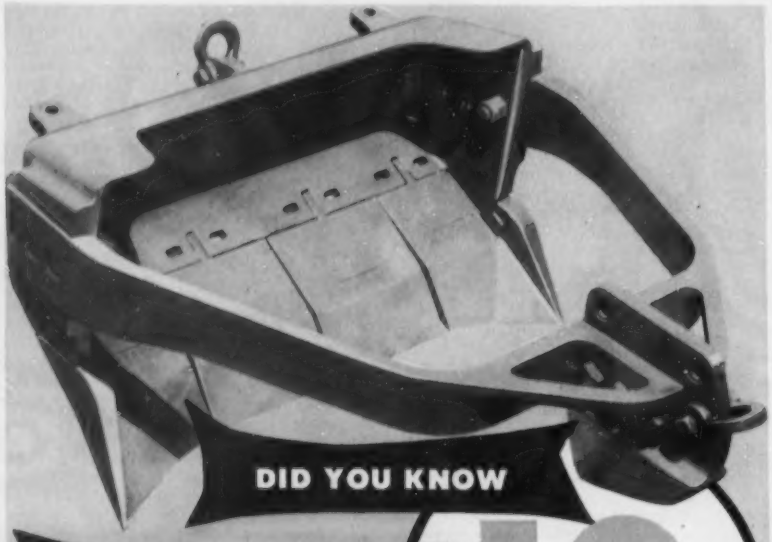
TURKEY—During 1954 the sale of Turkish chrome ore has been very small. Most of the chrome mines operators have slowed down their production or have ceased operation entirely until the market improves.

JAPAN—Production of primary aluminum increased from 4,659 tons in May to 4,710 tons in June. Installation of additional production equipment brought about part of the increase.

MALAYA—Sungei Kinta Tin Dredging Ltd. has been forced to close down its dredge for docking and replating work caused by deterioration of the hull. However, the firm hopes to have it back in operation by the middle of November. Output for the first five months of this year showed a marked improvement over the same period of last year, with costs generally declining.

INDIA—During the last field season (November to April), the Geological Survey of India carried out more than 300 items of field investigations which may be broadly classified into detailed geological mapping, intensive mineral surveys, geophysical, engineering geology, and ground water investigations. Particular attention was paid to the exploration of manganese ore in Madhya Pradesh; lead and zinc deposits of Zawar, Rajasthan; copper deposits in Almora district, United Provinces, Alwar district, Rajasthan, Jubbulpore district, Madhya Pradesh, and Singhbhum district, Bihar; coal in Khasi and Jaintia Hills, Assam; and limestone deposits in the Dehra Dun-Mussoorie area of United Provinces and southern Saurashtra. A two-day conference of the Central and South Indian states was held recently to formulate a program for exploration and detailed prospecting of the mineral resources of these areas. The conference endorsed the ideas of the Central Government that minerals form the basis of industrial development and that the work of exploration and detailed prospecting by the Geological Survey of India and the Indian Bureau of Mines should be intensified.

MALAYA—The Kelantan State Government has approved the transfer of a lease on the iron mine at Temangan from the *Metal Export Corporation* to



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Boustead & Co. Ltd. A survey team has been sent out to determine the size of the deposit, and another group will arrive later to advise on transportation and shipping methods. Boustead's partner in the venture is *Kokan Mining Company* of Tokyo, Japan.

PAKISTAN—The aerial photographic survey of West Pakistan being undertaken by the *Photographic Survey Corporation of Canada* as part of Canada's contribution to the Colombo Plan is proceeding right on schedule, says J. M. Henderson, Pakistan project manager. The surveys total $3,000,000 and are said to be the largest ever undertaken by the firm. Air photography of almost all of West Pakistan, except for the high mountain section in the extreme north, is being undertaken and is about 90 percent complete. Also part of the project is a geological survey of the Baluchistan area; a soil and agricultural survey of the lower Indus Valley and other areas; and planimetric mapping of the upper Indus region and of the cities of Karachi and Hyderabad. The information is expected to help in planning irrigation projects, eliminating risks of land deterioration, and in enabling exploration and prospecting in likely regions of oil and metallic mineral deposits.

THAILAND—The Department of Mines had reopened its tungsten mine at Sapum in Bhuket. Equipped by MSA, the mine was closed down last year when the local tungsten price dropped to its lowest post-war level.

NORTH AMERICA

BRITISH COLUMBIA—In a $300,000 cash transaction, *Cariboo Gold Quartz Mining Company Ltd.* of Vancouver has acquired the *Island Mountain* mine of *Island Mountain Mines Company* at Wells. The Island Mountain has yielded well over $12,000,000 worth of gold in the last 21 years. Its shaft is 900 feet deeper than the deepest Cariboo workings and is nearer some the best Cariboo ore bodies than the Cariboo shaft. The shaft also will give access to Cariboo's *Mosquito Creek* property immediately north of the Island Mountain mine. Under the enlarged single operation, Cariboo expects to reduce unit operating costs considerably. W. B. Burnett is president of Cariboo; Island Mountain is a subsidiary of Newmont Mining Corporation, New York City.

ALASKA—The present high price of quicksilver has encouraged the *DeCoursey Mountain Mining Company* to go into full production at the *Red Devil* mine near Sleitmut on the Lower Kuskokwim. The flasks of mercury are transported from the property in the company's private plane. Some exploration work has been also started by the firm in other parts of the same district.

ONTARIO—*Algom Uranium Mines Ltd.* is accelerating development of its *Nordic Lake* ore deposit now that development plans for its *Quirke Lake* ore body are complete and work on the main shaft is well advanced. Seven drills are at work on the Nordic section, and production plans for the area will be formulated when this exploration work is done. In the same area, *Pronto Uranium Mines Ltd.* reports excellent progress in all phases of work as preparations are made to cut the mine's No. 1 level station. Concurrent with present contract work for sinking of a 3-compartment, 575-foot, 4-level shaft, along with certain lateral development work and the establishing of a major capacity ore and waste pass system, the company is progressing with construction of permanent mine building facilities. Objective is for the Pronto plant to take over completion of contract work early next year. Design of the Pronto mill is reported well advanced and no difficulty is expected in having the plant in operation by September 1, 1955.

SASKATCHEWAN—A pitchblende discovery has been reported on a group of claims on Laird Island in Tazin Lake, 25 miles northwest of Prince Albert. A new firm, *Mylamaque Company* of Quebec, is said to be drilling the property with plans for development.

BRITISH COLUMBIA—*Aluminum Company of Canada, Ltd.* has completed the first stage of its vast hydroelectric and aluminum smelter project at Kitimat. The hydroelectric plant's capacity will eventually be 2,240,000 horsepower, supplying the smelter which will have an annual production of 550,000 tons. The first stage, now in operation, uses 420,000 horsepower and will produce 91,500 tons of aluminum annually. The project has

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taken three years and $275,000,000 to bring it into production.

ONTARIO—Two Chisholm, Minnesota men have formed *Stanol Minerals, Ltd.* which will operate an iron ore mine on Rainy Lake in Ontario. Walter K. Steinke is president and Mel Ranta is secretary-treasurer. The ore is of high-grade magnetite, reportedly much higher grade than the hematite ore being exported from the famous *Steep Rock* mines, 90 miles east. Mining equipment is already on the property and production should be under way shortly. A road connecting Rocky Inlet, the shipping point, with the *Stanol* mine is under construction.

ALASKA—The *Big Hurrah* gold mine in the Nome district is about ready to start production after a great deal of rehabilitation work. The operators, *Alaskan Associates Ltd.* of Portland, Oregon, have applied for certification for Territorial tax exemption allowed to new producers for the first 3½ years of production.

ONTARIO—*Mining Corporation of Canada, Ltd.* reports that its diamond drilling on the *Pitchgoma Mines Ltd.* property and the *McVittie* claim group in the Blind River area, and the *Bruns-Mines Ltd.* property in New Brunswick failed to locate anything of importance and these options were allowed to lapse. The company has taken an option in Falconbridge township, Sudbury area, and diamond drilling is now in progress. The firm is also doing work on various claim groups in Ontario and Quebec, and in addition has five prospecting parties in the field and participations in a number of prospecting syndicates. A 50 percent participation with *Noranda Mines Ltd.* was taken in financing exploration on *Lake Kaginu Mines Ltd.* property south of *Geco Mines*, and a formal agreement was made with Geco to take over the management of that operation.

NEW BRUNSWICK—*Technical Mine Consultants Ltd.* has acquired uranium property in York County, about 20 miles south of Fredericton, N.B. The company optioned 27 claims, and staked 153 claims. A block of 180 claims were staked and optioned on behalf of the Hirshhorn interest, covering an area about one mile wide and 12 miles along a strike of favorable formation. The discovery is described as a sheared zone in acidic volcanics of Mississippian age. Full width is not yet exposed. A diamond drilling program will start soon.

SASKATCHEWAN—*National Explorations Ltd.* has staked 12 claims in the Grease Lake area, about 65 miles east of Beaverlodge. Shaft sinking to a depth of 225 feet has been started at the firm's *Pat* group at Beaverlodge Lake, after construction of 2,000 feet of road to the property. It is planned to crosscut at the 100-foot horizon in a few months.

BRITISH COLUMBIA—*Lone Bachelor Mines* is speeding up development work on its lead-zinc-silver property in the Slocan district, in preparation for mill shipments. Drifting is on the fourth level and on the sub-level immediately above. Some drilling is also going on from the fourth level, and bulldozing will be carried on on the hillside for eventual opening up of a fifth level portal.

ALASKA—The first robbery of sluice boxes in the territory since the early gold rush days has been reported by Martin Suther who operates a mine on Alder Creek. He estimates that gold concentrate worth between $1,500 and $10,000 was stolen from several of his sluice boxes just before clean-up time. This offense was once regarded as seriously as horse-stealing in the history of the early west.

BRITISH COLUMBIA—*Sheep Creek Gold Mines, Ltd.* has been operating its new Mineral King mill near Inververe on a tune-up basis for the last few months and hopes to have it operating at capacity soon. In July the mill treated 11,500 tons of ore, and this has been increased each month. Ore in the first ore body had proved to be more difficult to treat than originally expected. No development work has been done in the *Mineral King* mine in recent months so blocked out tonnage still remains at about 407,600 tons averaging 2.1 percent lead and 5.0 percent zinc.

LATIN AMERICA

BRAZIL—Three strategic materials will be swapped for 100,000 tons of United States wheat under a recently completed agreement between Brazil and the United States. The wheat, about 3,733,000 bushels, will be traded for thorium, rare earth, and monazite for the United States Atomic Energy Commission.

CHILE—The Ministry of Mines is negotiating with a German firm, *Montan G.M.B.H.*, for the erection of a copper refinery in Chile. Montan reportedly has offered $2,000,000 worth of machinery if Chile would provide 250,000,000 pesos for construction. The Minister of Mines has counteroffered with a five-year repayment plan if the German company would finance the entire project. This is now under consideration. The proposed copper refinery would have an annual capacity of 30,000 metric tons, and would treat ore from locally owned medium and small mines.

MEXICO—The government has granted a 90-day extension to the *Texas International Sulphur Company* on its September 7 deadline for selecting 16,818 additional acres for sulphur exploration in the Isthmus of Tehuantepec, state of Vera Cruz. The company already holds exploratory rights to 106,732 acres in the Isthmus, and has defined three salt domes on the concessions. Core drilling is now under way.

PERU—*Fermin Malaga Santolalla e Hijos* has completed construction of a new 250-ton concentrator at its *Pasto Bueno* tungsten mines near Pallasca, Department of Ancash. This was part of an expansion program undertaken with the aid of a $650,000 Export-Import Bank loan. The money also financed construction of a road to the property and purchase of equipment for a power plant. The new concentrating plant has two primary sections: gravimetric concentration to produce a 40 percent WO_3 concentrate; and flotation to produce a 70 percent WO_3 concentrate suitable for direct shipment to the United States. The Callao plant which had been carrying out the flotation separation will now treat only the concentrates produced at the *Tamboras* mines owned by the same firm.

MEXICO—Mining executive Romulo Gutierrez is reported to have arranged for purchase of machinery to develop new mercury ore reserves in the state of

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San Luis Potosi. He plans to take advantage of the United States government's recent announcement of a three-year mercury purchasing program with a guaranteed price of $225 for a 76-pound flask. Prices last year ranged from $183 to $217 a flask. Present prices are about $285 to $295.00 per flask.

CUBA—*Compania Minera Moa* is presently producing about 3,500 tons of chrome ore monthly from its property in the Punta Gorda area. Another chrome-bearing area exists between the cities of Camaguey and Minas but production there is now very small.

BRAZIL—At Casa de Pedra, source of much of *Volta Redonda* steel plant's iron ore *(Cia. Siderurgica Nacional)*, a new aerial tramway is to be built with a capacity of 300 tons an hour. With the new installation, it is expected that about 1,500,000 tons of ore will be transported down to the Central do Brasil Railroad's loading platforms each year.

COLOMBIA—*Frontino Gold Mines Ltd.* is carrying on an active development program in its *Silenco* mine at Antiquia. In the 280 north winze area of the Manto vein, enough ore is being encountered to justify opening up this area, although so far no additional ore body has been located. In the *Cristales* mine, ore is now being produced from stopes. A new vertical shaft is being sunk at Cecilia. Ore reserves at the end of 1953 were set at 177,930 tons in the Silencio mine, and 3,140 tons in the Cristales mine. It appears now, from additional ore developments, that these reserve estimates were on the conservative side.

MEXICO—The government Agency of Mines in the State of San Luis Potosi reports that there is a fluorspar prospecting boom on in that state. Fifty new claims have been filed to date, covering an area of 30,000 hectares, and it has given employment to several hundred workers. One company has built a road approximately 15 miles long to the spa of Lourdes for hauling minerals by truck. From Lourdes the material will be shipped by rail to San Luis Potosi. The boom is attributed to the desire of United States mining interests to purchase cobalt, mercury, and fluorspar mines in the state. It is reported that *Alta Consolidated Mining Company* has purchased a mercury mine in the Villa Guadalupe district and has offered to buy others in that district.

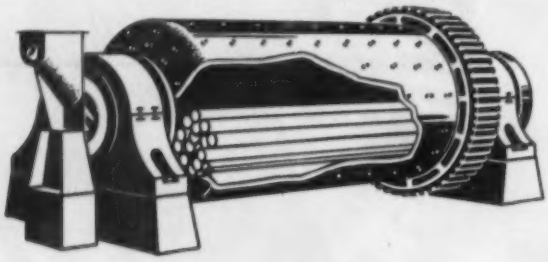
PERU—*Cerro de Pasco Corporation* expects to have its *Cuajone* porphyry copper orebody completely blocked out by the end of the year. The area has been under development by diamond and churn drilling since early 1953. Until complete information is assembled, the size of the orebody will not be definitely known but present evidence indicates that it will be one of the world's largest porphyry copper deposits.

COLOMBIA—For the six months ended June 30, *Pato Consolidated Gold Dredging, Ltd.* dredged 12,635,200 yards to recover 90,735 ounces of fine gold. For the same period of last year the firm dredged 8,227,700 yards to recover 78,872 ounces. *Asnazu Gold Dredging, Ltd.* dredged 1,516,000 yards during the same six-month period of 1954, to recover 6,735 ounces of fine gold; in the first six months of 1953, the firm dredged 3,241,600 yards to recover 8,714 ounces.

PERU—The high price of mercury is expected to bring about the reopening of the *Santa Barbara* mercury mine owned by the Fernandini interests in the Department of Huancavelica. The mine has been worked intermittently since early Colonial days. It was closed down in 1915, then reopened during 1943 to 1946 when a retort plant was erected. The mill had a capacity of 300 tons daily, and furnaced ore with a mercury content of 0.1 percent. Designed as a pilot operation to handle 100,000 tons of ore a year, it was estimated that recovery would be 100 tons of metal. However, the wartime market collapsed about the time that the plant was completed.

MEXICO—A group of *Republic Steel Company* mining experts are reported to have recently visited the *Pluma Hidalgo* rutile (titanium) deposits owned by Juan Moreno in the state of Oaxaca. Mr. Moreno indicates that Republic will develop his holdings with an investment of several million pesos.

BRITISH GUIANA—Photo mapping of a 38,000-square-mile area in central British Guiana is being carried out by *Spartan Air Services, Ltd.* of Ottawa, Ontario, Canada, at the request of the Colonial Surveys Office in London. The survey is being flown at 15,000 feet and will provide air photos for mapping purposes. Chief operational problem is weather; the clear cloudless days needed for air mapping are infrequent in the Tropics. Approximately 20,000 air photos will be required to cover the 38,000



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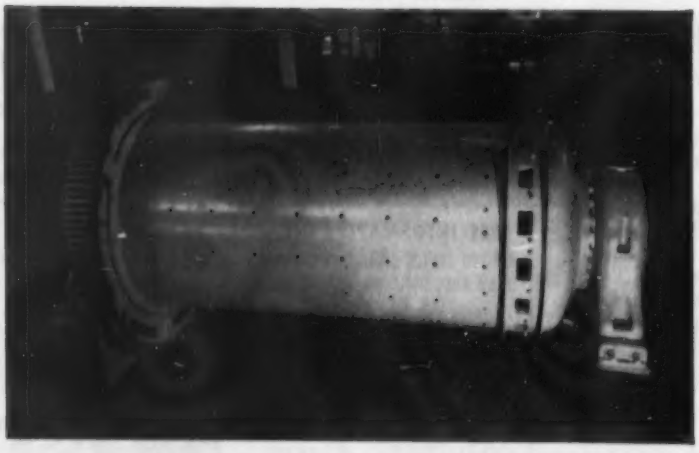

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CUBA—*Compania de Manganeso Oriental Americano*, subsidiary of *Pan American Minerals Corporation*, is in the process of financing a $3,000,000 plant which will be able to treat 800 to 1,200 tons of ore daily producing 250 to 400 tons of high-grade (50 percent) manganese nodules. The plant is to be financed ⅓ by the semi-official Cuban Development Bank (Banfaic) and ⅔ by the United States government. Pan American Minerals Corporation will put up about $1,000,000 for operating capital. Manganeso Oriental owns land in the Ponupo del Manacal region of Oriente Province; the deposit is estimated to contain 600,000 tons of low-grade ore with 20 percent manganese. Adjoining the Ponupo area, the firm also has leases on land estimated to contain 2,000,000 to 3,000,000 tons of ore. Near the *Charco Redondo* mine operated by *Compania Construcciones Cajigas*, currently producing 25,000 tons of 42 to 44 percent manganese monthly, the company also has property. At Taratana, Manganeso Oriental is producing 1,500 tons of 42 to 46 percent manganese monthly. Exploration work is also being conducted at Amaro in Las Villas Province.

ARGENTINA—A recent survey indicated that the kaolin deposits of San Alberto in the Sierra Grande hills are very extensive. Inadequate exploration makes estimates of the reserves difficult; however, a plan for exploration and investigation of methods of treatment has been requested.

PHILIPPINE ISLANDS — *Benguet Consolidated Mines, Inc.* has concluded a contract with the United States government to ship an additional 250,000 tons of chrome ore. The contract increases present ore exports of the mining firm to 40,000 tons monthly, and increases the country's dollar reserves by about $600,000 monthly. The firm will now be exporting 480,000 tons a year valued at $7,200,000. During the first seven months of this year the firm exported 241,000 tons of chrome ore.

WESTERN AUSTRALIA—*Shaw River Alluvials N.L.* has been formed to acquire a number of tin-bearing claims at Shaw River in the Marble Bar district of the Pilbara Goldfield. Operations previously had been by small parties and recoveries of concentrates to date are 6.2 pounds per cubic yard. It is believed that tailings also have carried 3 pounds per cubic yard. No statement has been made concerning yardage available but one of the company's objects will be to determine the extent of economic mineral-bearing areas. At Koolanobbing, a large pyritic body, overlain by iron oxide, has been indicated by diamond drilling. The state government has sunk three drill holes which prove the existence, at depths of 1,100 feet, 600 feet, and 500 feet, of the pyritic body varying in width from 30 feet to 213 feet over a length of 1,800 feet.

PHILIPPINE ISLANDS—A team from the Philippine Bureau of Mines will undertake an intensive survey of local deposits of uranium and other allied minerals in accordance with recommendations made by a survey team of the United States Atomic Energy Commission. The U.S. team made a reconnaissance radiometric survey of uranium and related minerals in the Islands last year. *The Vitro Chemical Company* of Salt Lake City, Utah, is reported to have offered the Philippine government technical advice and equipment on a commercial basis in the development of economically workable sources of uranium in the islands.

FIJI ISLANDS—For the year ended June 23, 1954, *Loloma (Fiji) Gold Mines N.L.* treated 22,592 long tons to recover 11,462 ounces of fine gold. This was a decrease of 7,635 ounces over the previous year. *Emperor Gold Mining Company Ltd.* treated 159,572 tons to recover 60,507 ounces, an increase of 3,286 ounces over last year.

TASMANIA—*King Island Scheelite N.L.* at Grassy mined 18,700 tons of ore during a four-week period ended August 7 for a yield of 119 tons of concentrate. *Aberfoyle Tin N.L.* at Rossarden continues to mine approximately 5,000 tons monthly for a return of 60 tons tin concentrate and 30 tons wolfram concentrate. The orebodies are narrow quartz veins occurring in quartzites and shales. Mining began in 1927. Ore reserves are 200,000 tons.

PHILIPPINE ISLANDS—*Philippine Iron Mines* at Larap in Camarines Norte broke a record in July with an output of over 100,000 tons of iron ore. The firm has recently completed a sintering plant for recovering the fines at the company's *Larap* mine in the Bicol region. Japanese steel mills are reported to be interested in purchasing the sinter.

QUEENSLAND—*Tableland Tin N.L.*, working in Black's Creek, a tributary of Smith's Creek, continues to report high recoveries—70 to 100 tons of concentrate per month from about 250,000 cubic yards. When the dredge enters Smith's Creek, it will have ahead of it 50,000,000 cubic yards in which drilling indicates a content of 11.25 ounces per yard. Since Australia is an importer of tin, this is particularly valuable to the commonwealth.

WESTERN AUSTRALIA—The Department of National Development has begun aerial surveys for oil and uranium in the Kimberley district in the northwestern part of the state. The country to be surveyed is from Wyndham to 40 miles south of Hall's Creek. It is similar to the Rum Jungle area of the Northern Territory but little is known of its resources. Two Dakota planes equipped with scintillometers will be used for the work.

NEW SOUTH WALES—*Uranium Consolidated N.L.* is a newly formed company which proposes to acquire options over leases at Emmaville known to contain torbernite. The areas are adjacent to options held by *Northern Territory Prospecting and Development N.L.* Other companies interested in uranium in the New England area (where Emmaville is located) are *Tungsten Consolidated N.L.* and *Border Tin N.L.*

NORTHERN TERRITORY — *North Australian Uranium Corporation N.L.* has secured from the state government a prospecting authority over 651 square miles in Arnhem Land known as Sleisbeck. Samples taken show U_3O_8 contents varying between 0.4 percent and 2.48 percent. Work to date includes open cutting, diamond drilling, wagon drilling, and trenching. A line of mineralization extending over 1½ miles shows high anomalies to airborne scintillometers. An airstrip has been constructed and a road is being bulldozed. Most other areas pre-

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viously acquired by the company have been abandoned but 70 square miles on the A.B.C. area and an area near Coronation Hill have been retained. *Rio Tinto Ltd.* of London has an area in the A.B.C. reserves adjacent to that of North Australian Uranium. This is about 180 miles from Darwin.

PHILIPPINE ISLANDS—A representative of *Ventures, Ltd.*, William C. Schmidt, recently conferred with Director of Mines Benjamin Gozon on the possibility of developing and mining Philippine laterites. These deposits are known to be among the largest in the world, and have not yet been developed because of metallurgical difficulties in separating nickel and chromium from iron.

NEW SOUTH WALES—*Tungsten Consolidated Ltd.*, whose mine at Frogmore is in difficulties as a result of the lower wolfram prices, has acquired an option over 440 acres at Gordonbrook, northern N.S.W. Surface samples of torbernite there have given counts of over 40 times background.

NEW ZEALAND—New Zealand and the United Kingdom Atomic Energy Authority have decided to produce heavy water and electric power from geothermal steam despite a previous decision not to continue with the heavy water plan. An initial unit will be installed at Wairakei to produce 40,000-kw. of power. Exhaustive tests during the last two years now appear to indicate that conditions are favorable for heavy water production.

ITALY—Sicilian regional authorities have decided to extend their guarantee to the loans to be received by operators of the island's sulphur mines under provisions of a special 9,000,000,000 lire fund established by the national government in 1951. Until now utilization of the fund, set up to overcome the serious crisis in the Sicilian sulphur industry, has been proceeding slowly because of the strict guarantee requirements of the loan fund.

BELGIUM—The Soviet Union has offered to sell ferromanganese to Belgium at the price of $160 per ton. The offer was accepted, according to the Belgian Department for Foreign Trade, after ascertaining that it had not been made in an effort to flood the market. Size of the transaction was not made public.

YUGOSLAVIA — Approximately 100,000 tons of ore per year are being mined at the extensive *Idria* mercury mine workings. Average mercury content of the ore is 0.5 percent. Mercury production is now at the rate of 500 tons per year. Six shaft furnaces treat approximately 16 tons of ore daily, in addition to the four Cermak-Spirek gas-fired tile furnaces which handle daily quotas of 15, 60, 80, and 100 tons of "rich" ore and briqueted dust.

EAST GERMANY—Iron ore production in East Germany reached 270,000 metric tons during the first quarter of 1954, according to an official report from East Berlin's Central Administration for

Statistics. Production of rolled steel during the period was reportedly 332,500 metric tons. Production for the comparable 1953 period was reported to be 211,400 tons for iron ore and 310,700 tons for rolled steel.

NORWAY—*Lokken Verk*, subsidiary of *Orkla Grube A/B* and operator of the Orkla pyrite mine, hopes to step up its refining by nearly 100 percent with a new electrolytic process now being perfected by the firm. The process would increase the value of each ton of pyrite an estimated 200 krone. The comparatively slower Orkla process now being used is expected to deplete the 6,500,000-ton pyrite ore reserve within 20 years.

ENGLAND — *Aluminum Laboratories Limited*, the research, engineering and geological exploration unit of *Aluminum Limited*, has completed expansion work on its research laboratories at Banbury, Oxford. Begun in 1951, the work has cost more than £300,000 and added 44,000 square feet to the floor area, providing a total area of 65,000 square feet.

ITALY—Average grade of crude ore at the *Pestarena* and *Lavachetto* gold mines in the province of Novara is currently 0.13 ounce per ton. This is a drop from the high of 0.38 in 1948 and reportedly is due to a change-over to non-selective mining methods which have raised the tonnage and output per man-shift considerably. Monthly production of crude ore at the mines, operated by the *Azienda Minerali Metallici Italiani* (*A.M.M.I.*), is approximately 6,300 tons. At the flotation plant the arsenopyrite concentrate assays 2.4 to 2.8 ounces of gold per ton. This concentrate is cyanided and part of the tailing is sold to arsenic plants for recovery of arsenic.

HUNGARY—Iron and steel output reportedly has fallen short of quotas set for the first half of 1954. A shortage of 34,000 metric tons of pig iron, 43,000 tons of open-hearth steel, 15,000 tons of electric-furnace steel, and 4,500 tons of rolled steel was reported by the acting Minister of Planning. The government has called for a three-month reserve of rolled steel in order to meet production quotas on time.

CORNWALL—A loss of £56,586 has been reported by *South Crofty, Ltd.* because of the drop in tin prices, although tonnage crushed at the operation near Caru Brea was increased by 7,958 during the past year. Efforts are being made to increase output even more in order to lower costs which have been about £610 per ton. Limiting factors are a shortage of underground machine men and an inadequate pumping system. The plant's beam engine is being replaced with a new electrical pumping system, which is expected to effect a saving of £25,000 per year. Development work at the mine includes the discovery of a lode which was cut while driving to the North Roskear shaft in the Dolcoath section of the mine. An average of 1.02 percent tin and wolfram was recovered from the ore during the first five months of 1954, and production was 25,234 tons of ore. At the *Castle-an-Dinas* wolfram mines, a subsidiary of South Crofty in Wales, the output was 29.5 tons.

ITALY—Construction work is in progress at the *San Leone*, Sardinia iron mine on a magnetic separation plant that will be the biggest of its kind in Italy. Full capacity will be from 200,000 to 300,000 tons of magnetite concentrate per year.

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The plant is not expected to begin operations until 1955. At the *Nurra* mine in Sardinia a new kiln for calcining carbonate ore has been erected. Similar kilns have been installed at the *Pisogne* iron mines in Lombardy on the mainland.

PORTUGAL—The Portuguese government has given its approval to the installation of an iron and steel industry within the country. A company will be formed in the near future, backed by both private and government capital. A concession for the production of pig iron and steel is to be granted to this new firm giving it, particularly, exclusive rights for ten years to the production of steel ingots and rolled products. The company must present to the government within a year after the granting of the concession, a detailed plan of the industrial installations, location, production capacity, etc. Supplies of local raw materials are considered to be adequate.

RUMANIA—The first Rumanian kaolin mine, opened in October 1950, has not been able to fulfill even the minimum requirements of the Rumanian industry. It is now reported that around the first of this year other deposits were found near Harghita in the Harghita Mountains. Work was started on the open-pit deposits, and also on construction of a washing plant and storage units.

CZECHOSLOVAKIA — Uranium is making Czech mining news. An extensive deposit has reportedly been found near the German border in the area of Susice and Prackovice in the central Prerov region. Top managers and engineers on the job are said to be Soviet uranium specialists. The area has been closed to general travel.

EAST GERMANY—The Soviet-controlled *Wismut, A.G.* is reported to be clearing the Steiger Forest, preparatory to enlargement of the present uranium mines in the area. New drilling activity has also started in the area. The expansion of the uranium project has forced about 600 inhabitants of the village of Gommern out of their homes. This is the third case in which an entire village has been evacuated to make room for the uranium mines. A new shaft is to be sunk in the vicinity of Gommern this year.

AUSTRIA—Most recent estimates concerning the reserves of Austrian iron ore have proved 321,000 metric tons of ore with more than 30 percent Fe content. About 85,000,000 metric tons of iron ore with an Fe content ranging between 20 and 30 percent are also reported; these deposits are not presently being mined. With an annual production of about 2,600,000 metric tons of 30 percent Fe ore, the deposits are expected to last about 50 years.

HUNGARY—Hungarian blast furnaces are reported to be using 700 tons of iron ore daily, all of which is imported from the Soviet Union. In return Hungary delivers ships to Russia. Eight blast furnaces are in operation at the moment: they include the modern one at Stalinstadt (formerly Dunapentele), another large and modern one at Diosgyor; two smaller and older ones at the same location; and four small and old ones at Ozd. Until 1948 when Yugoslavia broke away from the Soviet bloc, it had been the chief source of iron ore for Hungary but since then supplies have been stopped.

WALES—Low-grade uranium ore is reported to have been found in the Dolgelly district of north Wales. It probably will not be developed as long as Great Britain has access to high-grade ores from Africa, Australia, and Canada.

ITALY—Satisfactory results are reported in the operation of a sink and float plant installed for the beneficiation of low-grade manganese ores in a mine near Genua. The feed is a highly siliceous ore at 14 percent manganese and the grade is currently raised to about 31 percent. Before introducing the sink and float plant operation, the only practical way of upgrading the ore was by hand picking, as other gravity concentration methods proved ineffective and flotation, even if possible, was too expensive.

UNION OF SOUTH AFRICA—Gold Mining operations throughout the producing fields of the Transvaal and the Orange Free State reflect a marked expansion during the first six months of the current year, compared with the same period of last year. Tonnage milled increased to an annual rate of nearly 60,500,000 tons; excluding miscellaneous gold output, the recovery has risen to an annual rate of about 12,120,000 fine ounces. Miscellaneous recovery which includes output by the smaller mines in the Transvaal and from byproduct operations has also risen to an annual rate of 500,332 fine ounces.

GAMBIA—The government of Gambia and *British Titan Products Ltd.* of York, England have signed a 30-year agreement for the development of titaniferous mineral resources in Gambia. The British firm will set up a subsidiary, *Gambia Minerals, Ltd.*, to do the work. The firm had been prospecting in Gambia for some time, and had reported indications of ilmenite near Sanyang, a village in Kombo South Division, about 30 miles south of Bathurst, last year.

NIGERIA—*Naraguta Tin Mines Ltd.* had a consulting engineer inspect its properties in Nigeria early this year. He has reported that the Korot area which adjoins the columbite areas of the *Jantar Nigeria Company Ltd.* contains columbite as well as tin deposits. Sectional sampling of faces of open-cast paddocks has revealed that full depth of ground contains important columbite values, and the sampling of decomposed bedrock in paddocks has shown that it also contains high columbite values to a depth of 20 to 25 feet. Arrangements are now being made to install gravel pumps for working this ground. Although 25 feet is the deepest depth sampled, it appears possible that further prospecting will reveal additional values. A feature of the columbite found so far is the high percentage in the overburden, wash, and bedrock which makes it readily recoverable by ordinary alluvial methods. The grade of tin seems too low for current prices.

UNION OF SOUTH AFRICA—The No. 3 vertical and subvertical shafts sunk jointly by *Vaal Reefs Exploration and Mining Company* and *Western Reefs Exploration and Development Company* are now completed and in operation. In the Vaal Reefs mine property, the No. 1 ver-

tical shafts (twin units) are nearing the sinking stage, with the completion of the concrete collars and of the foundations for the temporary sinking hoists, the erection of which is proceeding. One of the twin shafts will be the main hoisting unit, and the other the ventilation unit. In the ventilation unit of the No. 1 subvertical shafts (twin units, also), sinking was advanced to a depth of 323 feet below the main bank on 40 Level, following commissioning of the sinking hoists earlier in the second quarter. At the subvertical main shaft, the platform hoist and the 1,800-hp. permanent rock hoist are being erected. The 1,335 feet of reef sampled in the second quarter averaged 498 inch-dwt. compared with 770 feet averaging 521 inch-dwt. in the first quarter.

FRENCH MOROCCO—*Compagnie Miniere de Djebel Mansour* is currently developing a lode of gold-bearing quartz at Tiouit in the Djebel Sarho. Recovery is at a rate of about 15 kilograms of gold per month. The company also owns a similar deposit a few kilometers away at Jemaa n'Ougouli. This consists of small quartz lodes with variable strikes and dips, deeply seated in granite. Research work has just been started in this area by *Union Miniere d'Outremer* in agreement with the claim holder.

NIGERIA—*Gold and Base Metal Mines of Nigeria, Ltd.* reports that production for 1953 was 552 long tons of tin concentrate averaging 73.6 percent metal. This compares with 570 tons averaging 73.9 percent in the preceding year. All earth moving equipment has arrived on the property and dam construction under its expansion program is almost complete. Certain production units were not received in time to take advantage of the seasonal 1954 rains but will come into full production next year. Prospecting work on the Plateau areas and in the Liruei area started during last year and results seem to be encouraging. Exclusive prospecting areas were staked during the year and prospecting on them will start this year.

FRENCH MOROCCO—The *Societe des Mines de Zenaga*, the only beryl producer in Morocco, is now engaged in exploration of the mica lens in Timgharine. Mining of the beryl lens at Anfarf ceased when the deposit was depleted, but exploration is still going on there.

UNION OF SOUTH AFRICA—Except for the completion of the ore-pass system which should be finished shortly, the equipping of the No. 3 Harmony shaft of the *Harmony Gold Mining Company, Ltd.* has been carried out; when the ore-pass system is completed, the shaft will be available for hoisting. Meanwhile, underground operations are limited to the hoisting capacity of the ventilation shaft. The reduction plant with an initial capacity of 45,000 tons a month is already making test runs, and extensions are now being made for 90,000 tons per month capacity. The uranium plant is under construction. Reef development results in the second quarter reflected a marked improvement: payability rose to 100 percent from 92.7 percent and average values to 901 inch-dwt. from 688; to June 30, a total of 10,000 feet were sampled and 95.2 percent proved payable averaging 647 inch-dwt.

NIGERIA—*Amalgamated Tin Mines of Nigeria, Ltd.* reports that it produced 240

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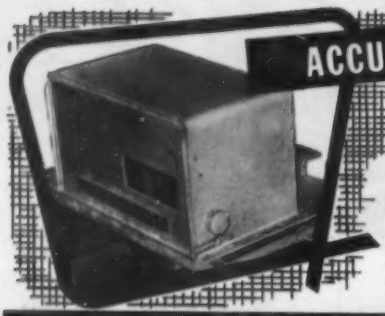

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tons of columbite concentrate during the second quarter of this year, as compared with about 128 tons in the same period of last year. Part of this output came from the mines of *Keffi Tin Company* (89.50 tons) and *London Nigerian Mines, Ltd.* (4.75 tons) in which Amalgamated holds the total issued share capital.

UNION OF SOUTH AFRICA—New gold finds in northern Transvaal have been reported from Petersburg. *Rand Mines Ltd.* is said to be taking up prospecting options over a three-year period at Bochum, and that drilling is to start soon.

FEDERATION OF RHODESIA AND NYASALAND—The Atomic Energy Division of the Geological Survey Board reports that new uranium sources have been located in the copper belt of Northern Rhodesia as a result of surveys made with a Land Rover airplane equipped with self-recording Geiger counter and scintillometer.

TANGANYIKA—The Commissioner for Mines, V. T. Hockin, has announced that as a result of a government survey promising deposits of pyrochlore columbium-bearing mineral have been found near Mbeya in the southern Highland province. He considers it likely that some millions of tons of potentially valuable ore exist though it is too early to give a reliable estimate of tonnage. The discovery has attracted the attention of a number of foreign mining firms.

UNION OF SOUTH AFRICA—Options over mineral rights of farms in the Northern Free State between Vaaldam, near Vereeniging, and Coalbrook, to the south of Vereeniging, are reported to have been taken up recently by one of the country's large mining firms. Gold is assumed to be the attraction, but in the area carbonaceous shale bands, which are known to be uranium carriers in certain other parts of the world, are known to be well developed.

BELGIAN CONGO—*Union Miniere du Haut Katanga* reports that *Societe General Metallurgique* of Hoboken has found a satisfactory method for producing electronically pure germanium oxide. Union Miniere expects to become a large germanium producer as soon as the process is placed in industrial operation.

LIBERIA—A German firm, *Gesellschaft Zur Verwertung Pflanzlicher Rohstoffe,* is reported to have been granted a 2,000,000-acre concession in the eastern part of Liberia for the exploitation of hardwood forests, development of palm plantations, and exploration of mineral prospects. The lease would run for 80 years.

ERITREA—Mine production has steadily decreased during the last few years partly because of an uncertain future. Yearly gold production dropped from 500 kg during the last years of Italian occupation to 25 kg. in 1953. All of these gold mines work quartz reefs and there is no production from alluvial deposits. To the southeast there are occurrences of rock salt, potassium salt, and sulphur adjoining those of Dallol in Dancalia (Ethiopian territory), but production ceased in 1952. However on the seacoast, especially at Massaua, salt is still obtained from seawater in several thousand tons annually. Recently the government has taken steps for the development of future mining, not only for gold but also by encouraging plans for prospecting the existing iron, copper, and other deposits.

U.S.A. Metal & Mineral Prices

METALS

September 15, 1954

COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	30.00¢
	Lake. Delivered, destinations, U.S.A.	30.00¢
	Foreign Copper. Valley basis	29.75-30.00¢
LEAD:	**Common Grade.** New York	14.50¢
	Tri-State Concentrates, jig, flotation 80% lead, per ton, Eagle-Picher	
ZINC:	**Prime Western;** F.o.b. E. St. Louis	
	Prime Western; Delivered, New York	11.50¢
	Tri-State Concentrate, 60% zinc, per ton	12.00¢
ALUMINUM:	**Primary 30 Pound Ingots (99% plus).** F.o.b. shipping points	22.20¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	29.00¢
BISMUTH:	(in ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$1.70
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.60
COLUMBIUM:	**Powder** Nom., per pound	$75.00
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.75¢
MERCURY:	**Flasks.** Small lots, New York	$303.00-$305.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery,, Port Colbourne, Ontario	60.00¢
TIN:	**Grade A Brands.** New York (Price per pound) Prompt delivery	93.50¢
TITANIUM:	**99.3%** + (Price per pound)	$4.72
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90½¢ per ounce
	Foreign Handy & Harman	85.25¢ per ounce
PLATINUM:	**Per Ounce**	$84.00-$87.00
ZIRCONIUM:	**Sponge, Per Pound**	$10.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	**10 to 12% BeO.** F.o.b. mine, Colorado	$47.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio	$44.00-$46.00
	African (Transvaal). 48% Cr_2O_3. No Ratio	$31.00-$32.00
	Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$50.00
	U. S. Government ore purchase depot Grants Pass, Oregon, base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore. Includes 100% bonus.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports	
	Mesabi, Non Bessemer, 51.5% Fe. Second quarter	$9.90
	Mesabi, Bessemer, 51.5% Fe. Second quarter	$10.05
	Old Range Non Bessemer. Second quarter	$10.15
	Old Range Bessemer. Second quarter	$10.30
	Swedish, Atlantic Ports, 60 to 68% Fe, **Contracts,** Per Unit	22.00¢
MANGANESE ORE:	**Metallurgical grade.** 48 to 50% Mn. Long ton unit	$1.05
	Metallurgical grade. 46 to 48% Mn. Long ton unit	$0.95
	Metallurgical grade. 45 to 46% Mn. Long ton unit	$0.85
	Chemical grade. 80% MnO_2. Per ton	$70.00
	Domestic U. S. Government are purchasing depots: Deming, New Mexico, base price $2.30 per long dry ton unit of recoverable manganese less handling and treating costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana base price of $6.43 per long ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS_2 F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.00
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit	$63.00-$65.00
	Foreign. 65% WO_3 Per short ton unit (Scheelite)	$25.00
	Foreign. South American, Spanish, Portuguese	$23.00
URANIUM ORE:	**Carnotite-Roscoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, Moab, Hite, and Monticello, Utah. Shiprock, and Bluewater, New Mexico, Edgemont, S. Dakota. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	**Carnotite-Roscoelite.** V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello, Shiprock, and Bluewater Per Pound V_2O_5	$0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b. Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois- Kentucky mines	$42.50
	Mexican. 70% f.o.b. border	$25.00
	European, Atlantic Ports, 70%	$37.00
	Acid Grade. 97% CaF_2 F.o.b. Kentucky, Illinois, Colorado	$60.00
PERLITE:	**Crude:** F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Haskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

September 15, 1954

		Per Long Ton	USA Equivalent cents per pound[1]
COPPER:	**Electrolytic, spot**	£246 10d 0s	30.56¢
LEAD:	**Refined, 99.97%**	£100 0d 0s	12.50¢
ZINC:	**Virgin, 98%**	£ 80 5d 0s	10.03¢
ALUMINUM:	**Ingot, 99.5%**	£156 0d 0s	19.50¢
ANTIMONY:	**Regulus, 99.6%**	£222 0d 10s	27.81¢
TIN:	**Standard 99.75%**	£733 10d 0s	91.69¢
TUNGSTEN:	**Long ton unit, 195s equivalent to**		$27.30

1. With Sterling pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

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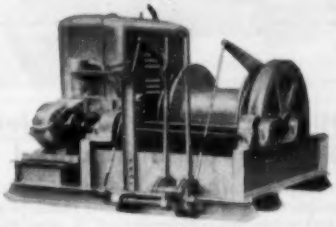

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High Frequency Reflection Seismograph Announced

Application of the reflection seismograph in mining exploration is made practical with announcement of a new high resolution reflection seismograph system manufactured by Houston Technical Laboratories. The HTL Model HR system is designed for extremely shallow reflection work and provides seismic information in the depth range of 100 to 2500 feet. In mining exploration it furnishes data for mapping depth and extent of overburden and buried channels. For more information circle No. 42.

Portable Rock Drilling And Breaking Equipment

Pitnam Industrial Products Company, 608 Fifth Avenue, New York 20, N. Y. has announced the availability of the "Pinazza" drills which have found wide application in Europe, Africa and South America for several years.

The Pinazza is driven by a small, portable gasoline engine or electric motor through one or more flexible shafts. It is reported that this direct drive principle results in efficient power utilization which, in turn, means that the power drive can be compact and of light weight. Additional details may be obtained by circling No. 47.

Marion, Osgood Operations Directed by Courtright

John P. Courtright, president and general manager of both the Marion Power Shovel Company and The Osgood Company, has been directing preliminary operating arrangements to strengthen the products and facilities of the two companies since their merger in June.

Although Marion Power Shovel Company has acquired controlling interests in Osgood, the latter firm will continue to function with its separate personnel and will still design and build machines under the Osgood-General name. Kenneth O. Williamson is to continue as Osgood-General sales manager for the domestic market; F. W. Raab, Jr., will continue to direct export sales.

Osgood subsidiaries included in the merger are The General Excavator Company and The Commercial Steel Casting Company.

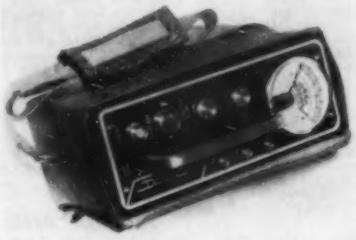
Reciprocating Conveyor for Dry or Moist Material

A new type of reciprocating conveyor designed to feed a constant volume of any dry or moist material from an overhead bin is announced by the Hydro-Blast Corp. of Chicago, Ill. Operation of the conveyor is not affected by lumps or variations in the consistency of the material. Units of various capacities are available and each conveyor is easily adjustable from maximum capacity to zero. The new conveyor is operated by plant air; the only electric power required is used to operate a solenoid air valve. Circle No. 72.

Geiger Counter Available For Export Distribution

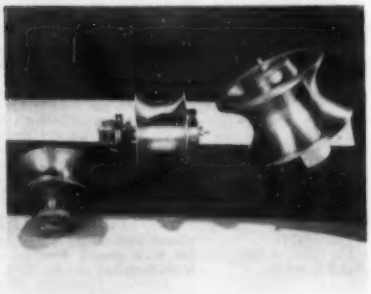
Availability for export of the new "Professional" Model 107-B Geiger counter has been announced by Terminal Radio International Ltd., New York City. This firm is the export distributor for Precision Radiation Instruments.

The Model 107-B is priced at $139.50, complete with batteries, earphones, carrying belt, radioactive sample and all instructions. Complete specifications are available by circling No. 44.



New Super Sensitive Uranium Detector

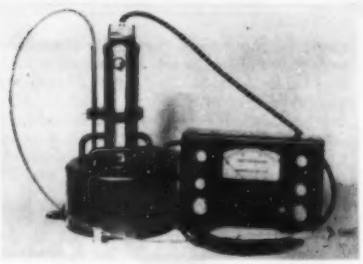
A new instrument, which is said to be the most sensitive radiation detector made, has been developed by the Detectron Corporation, North Hollywood, California. Using the remarkable new bismuth counter tubes, the new detector has been designated the Model 390-B Bismuth Nucliometer. It is reported that the 390-B is excellent for long range detection of radiation, for airborne use, for grid map surveys and for oil survey work. Radiation measuring only .005 MR/HR will give a full scale reading thus making the unit advantageous for deep deposits. For full details write to the Detectron Corporation, 5420 Vineland Avenue, North Hollywood, Cal. and request folder M1-M2 or circle No. 41.



A Solution For Certain Conveyor Belt Problems

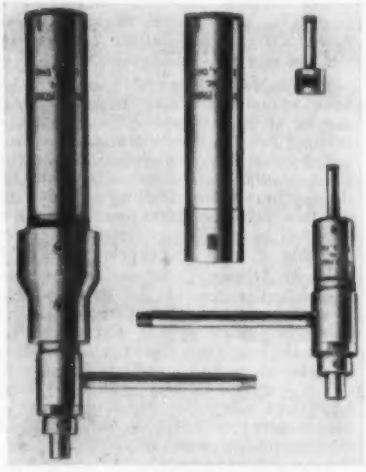
Convevor belt edges will not rip, fray or tear if held on course by this simple but ingenious adaption of the hyperbolic principle, according to Knapp Mills Inc., the manufacturer. Named a Guidler because it serves as an idler as well as a guide, the new device presents a long, smooth yielding surface to the belt edge instead of a single striking point.

It is reported that the efficient design and function of the Guidler will even prolong the life of belts otherwise ready for the graveyard. For more information circle No. 45.



Exploration Surveys With Scintillation Counters

The Radiac Company, Inc., 489 Fifth Avenue, New York 17, New York, announces the commercial availability of the "FERRET", an ultra sensitive scintillation survey meter for uranium and oil prospecting. The instrument consists of a Scintillation Detector Head and a Count Rate Meter. This unit was developed for making rapid airborne radioactivity surveys, but can be used from a moving vehicle. Circle No. 43 for full details.



New Vinoy Diamond Impregnated Drills

Diamond Products, Inc. announces a new line of diamond impregnated drills for use in laboratory or production line techniques. New tools are used in recoring of samples, drilling of anchor holes in mining or drilling operations, any drilling in glass, quartz, marble, granite, concrete, etc. for full particulars circle No. 48.

Merger Set for Dorr, Oliver United Filters

Directors of The Dorr Company and Oliver United Filters, Inc. have announced the execution of an agreement for the merger of the two companies after several months study and negotiations. A special stockholders meeting will be held in October to approve the agreement which would then go into effect December 31.

Name of the proposed company would be Dorr-Oliver, Incorporated, with headquarters at Stamford, Connecticut, the present Dorr headquarters. Edwin Letts Oliver, president of Oliver United Filters, and John V. N. Dorr, chairman of Dorr's board, would both be chairmen of the board. President would be J. Delano Hitch, Jr., and administrative vice presidents would be Edwin L. Oliver, Jr. and Douglas C. Reybold.

The combined sales of the two equipment and engineering firms in 1953 was in excess of $23,000,000 plus sales by foreign subsidiaries exceeding $6,000,000. It is anticipated that the combined assets of the two firms will permit greater expansion and research.

One-Yard Shovel Has "Speed-o-Matic" Control

The Link-Belt Speeder Corp. has presented the mining and construction field with a new one-yard shovel-crane (LS-98). The LS-98 has been specifically designed in answer to demands for a machine to combat rising costs, increasing competition, and shrinking profit margins. The heavy-duty LS-98 bridges the gap between the application and portability advantages of machines up to ¾-yard size and the output advantage of the larger, heavier sizes. One of the big reasons contributing to the increased productivity of the LS-98, claims Link-Belt Speeder, is its "Speed-o-Matic" control. As compared to manually controlled machines in the same class, officials state, the LS-98 offers up to 25 percent or more productivity. These are just a few of the many improvements incorporated in the new LS-98. For complete data circle No. 62.

WEMCO Opens Branch Near Grand Junction

The opening of a branch office and warehouse near Grand Junction, Colorado has been announced by Western Machinery Company, industrial and mining equipment firm with headquarters in Denver, Colorado.

Designed to serve customers on the western slope of Colorado and eastern Utah, the office is staffed entirely by graduate engineers. Directing engineering sales will be George Setter, mining engineer from the Colorado School of Mines. Other staff members include Bob Jordan, Jack Quist, and Paul Fillo.

Notes From The Manufacturers

MERCHEL M. RICHEY, factory manager of the Bearing and Rock Bit divisions, has been named general factory manager for the Timken Roller Bearing Company, Canton, Ohio. Joining the firm in 1916 as a toolmaker, Mr. Rickey became general superintendent in 1934, after having served as tool room foreman and machine shop foreman. He was named assistant factory manager in 1940 and factory manager four years later. His headquarters will continue to be at Canton.

Gifford V. Leece, vice president and sales manager of the Gardner-Denver Company, was named president of the Quincy, Illinois firm at a recent meeting of the board of directors. Serving with Mr. Quincy as executive vice president will be *Benjamin C. Essig*, who was formerly in charge of the company's Denver, Colorado plant.

John V. Houston, Jr., American Brake Shoe Company official, heads a new sales and technical service office for the firm in Duluth, Minnesota. A trained metallurgical and chemical engineer, Mr. Houston will concentrate on the sale of products used by mining companies in the area.

John A. Miscovich, president of the Intelligiant Corporation, Seattle, Washington, will act as a consultant for the Chiksan Company, Brea, California, under terms of a recently-completed agreement in which Chiksan will take over the manufacture and sale of the Intelligiant hydraulic mining gun. The equipment, used in removing overburden, will be manufactured in Chiksan's Brea plant and marketed under the trade name of Chiksan Intelli-Giant.

Richard F. Bergmann, Jr., is replacing *Gene A. Zwerner* as sales manager of Link-Belt Africa, Ltd., Springs, Transvaal, Union of South Africa. Mr. Zwerner will return to the parent firm, Link-Belt Company, in the United States.

Nordberg Manufacturing Company has announced the appointments of E. L. FARRELL (left) as district manager for the Milwaukee territory and WILLIAM C. YOUNG as district manager, Great Lakes territory. Both men will make their headquarters at Nordberg's main office and plant in Milwaukee, Wisconsin. They have both served as sales engineers for the company, Mr. Farrell in the heavy machinery division and on special assignments in the Milwaukee office, and Mr. Young in both the Milwaukee and Washington, D.C. offices of the company.

Northwest Mining Firms Join the Uranium Hunt

At least twenty-two mining firms with headquarters in Wallace, Kellogg, or Spokane have acquired or are acquiring uranium prospects in Utah, Colorado, or Wyoming.

The list includes many of the smaller operators in northern Idaho's famed Coeur d'Alene mining region. Most of them have zinc-lead mines or prospects in the Coeur d'Alenes. Low prices for base metals together with the comparatively low exploration costs and possible bonanza returns of uranium mining are responsible.

The Coeur d'Alene region firms include Highland-Surprise Consolidated Mining Company, Inspiration Lead Company, Nancy Lee Mines, Inc., Signal Mining Company, New Era Mines, Inc., Silver Bowl, Inc., Coeur d'Alene Silver Giant, Inc., Caledonia Silver-Lead Mining Company, Hypotheek Mining and Milling Company, Western Silver-Lead Corporation, Square Deal Mining and Milling Company, Silver Buckle Mining Company, Hayden Hill Consolidated Mining Company, Lookout Mountain Mining and Milling Company, Mascot Mines, Inc., National Uranium Corporation, Uranium Exploration Company, Uranium Mines, Inc., Uranium Holdings, Inc., Western Uranium, Inc., Vulcan Uranium Mines, Inc., and U. & I. Uranium.

The last half dozen firms named were incorporated recently. Several of the Coeur d'Alene region companies have headquarters in Spokane. Other Spokane firms with interests in the uranium plateau are Spokane Mining Syndicate and Alpine Mining Company.

Most of the Pacific Northwest firms have jumped into the uranium rush in the last couple of months. Several have reported uranium strikes.

Alpine Uranium Opens Old Silver-Copper Mines

The old Turk copper mine and the Deer Trail silver mine near Fruitland, southwestern Stevens County, Washington, are being reopened by Alpine Uranium Corporation of Salt Lake City, Utah which will undertake an extensive development program.

The old Deer Trail flotation mill is being rehabilitated, with mill capacity being increased from 30 tons to 125 tons. New machinery includes Gallagher flotation cells, a U.D. 24 Diesel-electric power plant, crushing plant, and automatic controls. Ores from other properties in the district will be milled on a custom basis.

At the mine bulldozing has opened copper-silver-cobalt ore over considerable widths. A contract for open-pit mining has been awarded to Harvey Gray of Spokane. The company also plans to mine a wide vein exposed in the mine. New mine buildings are being erected, and two miles of road have been built between the Turk mine and the mill.

Alpine Uranium is acquiring a 25 percent interest in the Turk and Deer Trail, and other claims under an assignment from Triumph Uranium and Oil Company of Salt Lake City. Triumph Uranium is purchasing the 1,000-acre holdings from Three Peaks Mining Company, also of Salt Lake City, for $225,000 and 25,000 shares of stock.

POWER CONVERSION UNITS

Heavy capacity—complete—ready for operation. Provide 125 volt to 550 volt direct current for mining machinery, haulage locomotives, cranes, hoists, etc. No moving parts to be serviced—automatic voltage regulation—require no warm-up period.

SYNTRON COMPANY
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Centrida Mines, Inc. reports good progress in exploration of the *Pope-Shenon* copper mine in Lemhi County, Idaho under a DMEA contract. A 150-foot crosscut has been completed on the 600 level and diamond drilling is being done from it. Work of extending the level 500 feet easterly is under way. Exploration also is under way on the 500 level. *Coeur d'Alene Silver Giant, Inc.* has a one-third participating interest in the firm.

Lower level tunnel work at the *Wonder* prospect near Tendoy, Lemhi County, Idaho by *Defense Metals, Inc.* of Kellogg has opened ore with considerably higher uranium content than found by upper level work last year. About 270 feet of drifting remains under the present DMEA contract.

Diamond drilling of the extensive *Silver Mountain Lead Mines* holdings east of Mullan, Shoshone County, Idaho is being done by *Hecla Mining Company* and *Bunker Hill & Sullivan Mining and Concentrating Company* under a profit-sharing agreement. Drilling of three 1,000-foot holes at 2,000-foot intervals is expected to provide geological data for planning of deep development work.

Hecla Mining Company has discontinued exploration of the *Atlas Mining Company* property east of Mullan, Idaho for an indefinite period. Extensive diamond drilling from the new 2,400-foot level failed to find commercial mineralization. Exploration was limited to about 1,500 feet along the strike of the two-mile-long property. R. W. Greenough of Mullan is Atlas president.

Among the new companies recently incorporated in Idaho are the following: *Magic Uranium Company* at Pocatello, by Ira Kunz, A. P. Oliver, and G. R. Cochran, all of Pocatello; *Fall Creek Uranium Corporation*, at Idaho Falls, directors I. Donald Jerman, and Joe and Edith H. Birch, all of Idaho Falls; *Uncomphagre Uranium, Inc.* at Idaho Falls, directors Ben J. Cohne, Leslie S. Cutler, and John L. Gashill, all of Idaho Falls; *South Mountain Mining and Concentrating Company* at South Mountain, by P. R. and Ursa Brandenthaler, of Terry, Montana, and H. Ferrel Anderson of South Mountain; *Flint, Tungsten, and Silver, Inc.* of Boise, by George T. Odon, Agnes Wigle, Bertha E. Holmes, and A. C. Allen, all of Portland, Oregon; *Minerals Leasing Company*, at Boise, directors Wellman Clark, G. S. Colburn, and Duane H. Watters, all of Spokane, headquarters of firm are at Grangeville; *U.S. Titanium Corporation*, Boise, directors W. H. Langroise, W. E. Sullivan, and Glorian Ledvina, all of Boise.

The *Big Eight Mining Company* has been formed to mine tungsten and other minerals in the Castlerock area 35 miles east of Mountain Home, reports Arthur

A. Creech of Basin, Wyoming. He and seven partners—Frank and Viola Hobson of Boise, Ted Ax of Emmett, Gene Ax of Boise, Clyde Creech of Basin, Dale Chamberlin of Greybull, Wyoming, and Grace Kanakaris of Walla Walla, Washington—have leased 3,000 acres from William Smith of Boise for mining operations which will begin soon.

Cordero Mining Company has its pilot mill in full operation now at its *Wildhorse* tungsten property halfway between Sun Valley and Mackay, Idaho.

At the east end of the Shoshone County silver belt, *American Smelting and Refining Company* is cutting a station and pockets for a new 3,400-foot level in the *Vulcan-Galena* mine. Deepening of the shaft from the 3,000 level was started last February after down-hole drilling showed downward continuation of the silver-copper vein discovered last year on the 3,000 level and subsequently explored upward to the 2,400 level. Four headings are being pushed to provide additional ventilation openings and a second escapeway. The mine is scheduled to go into production early next year. J. E. Berg of Wallace is manager of Asarco's Northwest mining department. *Day Mines, Inc.* has a 25 percent interest in the project.

In the center of the silver belt, *Polaris Mining Company* has started driving a 1½-compartment ventilation raise from the 3,000-foot level of its *East Exploration* project from the *Silver Summit* mine to connect with *Coeur d'Alene Mines Corporation's* 2800-level workings. The drift face is in the *American Silver-Silver Standard Compromise Area*. Several small shoots of silver-copper ore have been encountered in recent work.

Bunker Hill & Sullivan Mining and Concentrating Company has put into operation a new 202-foot smokestack at its Kellogg, Idaho lead smelter to replace one built in 1917. The new stack was one of the last projects in the smelter's $3,000,000 modernization program started in 1951. At the old *Crescent* silver mine east of Kellogg, Bunker Hill & Sullivan is pushing two exploration headings northerly and southerly from the mine's new 3,200-foot level. Work is on a three-shift basis. It is being done under a DMEA contract for more than $1,000,000. Stanley McDougall is manager of mines for the company.

James M. Williams, Spokane prospector, believes he has rediscovered a "lost" gold mine in Lemhi County, Idaho's rugged Salmon River country. In tracing a piece of hillside float, he found a prospect hole showing a 2½-foot vein carrying free gold. A tree, judged to be 80 years old, was growing from the hole. According to local legend, an early-day prospector made a "strike" in the area but soon left to get in on a gold rush to another state. Returning 20 years later, he was unable to find his earlier strike. Mr. Williams and two other Spokane area men have staked eight claims, bulldozed a road, and done some hand-trenching along 700 feet of the vein.

An open-pit mining operation is planned by Richard D. Riegel of Spokane on a vein of high-grade lead ore discovered by bulldozing at the old *Liberty* prospect at the head of Cougar Gulch near Murray, Shoshone County, Idaho. He also is considering construction of a 100-ton custom mill to treat lower grade ore exposed by tunnel extension work and ore which he believes could be produced at nearby properties if a mill were available. A 20-foot extension of an old 900-foot prospect tunnel cut the vein, and 350 feet of drifting and 70 feet of raising have been in good ore.

T. W. Walker and associates have been granted a lease on 500 acres of state-owned land in Blaine County, Idaho for uranium prospecting. Robert W. Blackman has bee ngiven a lease on 130 acres in the same area.

Radioactive ore discovered at the head of Rock Creek, 12 miles west of Hailey, Idaho, by *Primitive Exploration and Finding Company* has been identified as autunite in quartz. Assays have been very encouraging and the Idaho State Mine Inspector reportedly termed the showing the best uranium lode prospect in the state. Bulldozer operations, and diamond drilling are well under way. William Brooks is company secretary. Meanwhile, the U. S. Bureau of Mines continues churn-drilling of black sand deposits in the Rock Creek and Camp Creek areas.

Lead-silver values have improved in the west ore body on the new 1600-foot level in the *Hercules* mine, Burke, Shoshone County, Idaho, after passing through a lean zone. The mine is owned by *Day Mines, Inc.*

MONTANA

The *Monarch Mining Company* of Helena, Montana reports that commercial grade U_3O_8 has been found on its property near Elliston, Montana. D. L. Jones, general manager, says that A.E.C. field men have checked the discovery which is about 400 feet underground and about 1,000 feet in from the portal.

Key Tungsten, Inc. has been incorporated at Deer Lodge, Montana by H. L. and Nora Pitman, of Deer Lodge, and Everett Lemmons of Colbert, Washington. A high grade of scheelite is reported to have been uncovered and further exploration and development work are under way. H. L. Pitman has also been one of the incorporators of the *Gypsy Queen Mining Corporation*, together with Verne C. Homad. of Mead, Washington, and Fred J. Wood of Cleveland, Ohio. The Gypsy Queen firm will develop a discovery made at an old abandoned mine west of Deer Lodge, Montana, situated at an altitude of 8,500 feet. Exploration cuts are reported to have uncovered 6,300 feet of unbroken scheelite contact. Assays show scheelite, copper, and gold. The company is now engaged in opening up the old incline and in building a road. A DMEA loan has been applied for.

The contracting firm of *Cummings & Roberts* of California have leased a large deposit of high-grade fluorite located approximately 30 miles east of Darby, Montana, and have started open pit mining operations. Glen Hawe of Hamilton, Montana is manager of the property.

Nancy Hanks Mines, Inc. has taken a lease and option on the old *Nancy Hanks* gold mine near Garnet, Granite County, Montana. The firm was incorporated in June. John Reinhart of Portland, Oregon is president; W. J. Henderson of Spokane is secretary.

Production at the *Hand* mine near Argenta, Beaverhead County, Montana is running about one car of lead-silver-gold ore weekly. John Hand is owner and operator.

Uranium exploration is being carried on in the Three Forks area of Montana by *Uranium Exploration Corporation* of Houston, Texas. Initial work consisted of a magnetic survey. The firm has 30,000

Idaho Consolidated Tests Its New Concentrator

Testing of the new all-electric flotation concentrator of Idaho Consolidated Mines, Inc. is now under way at its Twin Peaks silver-lead-copper-cobalt mine, 18 miles south of Salmon, Lemhi County, Idaho. Pumice block and steel-reinforced concrete were used in its construction making the mill as fire-resistant as possible. Equipment for a 150-ton operation has been installed, but the 60- by 70-foot building is designed for expansion to 500 tons if production warrants it. There are several unusual features in the mill—among them, the installation of a gravity-fed concentrate bin in the floor of the building, and the fact that no pumps of any kind are in the plant—everything is gravity-fed. Tentative plans call for concentration of about 125 tons of ore daily, and trucking of concentrate to railheads at Mackay, Idaho, and Darby, Montana, for transportation to smelters at Salt Lake City, Utah and Butte, Montana. Edmund G. Wilson of Seattle is president of the firm.

acres of Montana under lease. V. B. Nelson is president.

Minerals Engineering Company is now producing 550 tons of tungsten ore daily on a six-day basis at its *Brown's Lake* open-pit mine in Beaverhead County, Montana. Milling is being carried out at a rate of 440 tons daily on a seven-day week at the Glen mill. The concentrates are shipped to the *Salt Lake Tungsten Company's* refinery at Salt Lake.

Considerable prospecting activity is reported in the Silver Lake, Georgetown Lake region of Deer Lodge and Granite counties, Montana for high-grade scheelite. The scheelite occurs as large and small high purity crystals in quartz. Several different operators are stripping overburden, drifting, and sinking shafts in favorable locations.

The United States Geological Survey has completed a map showing the distribution of occurrences of uranium-bearing material and of anomalous radioactivity in the Jefferson City quadrangle, Jefferson County, and Lewis and Clark County, Montana. Three mines in the quadrangle have produced uranium ore. The map is in open file for public inspection at U.S. G.S. offices in Washington, D.C., Denver, Colorado, and Salt Lake City, Utah. The Office of the Director, State Bureau of Mines and Geology, Butte, Montana, also has a copy.

Over a quarter century ago the first (and original) double-trunnion dump car was placed in service by Differential on the L & N. Sound engineering and careful workmanship were such that this car is still in service — still earning money for its owners.

Such details as hardened, self-lubricating pins in door mechanisms, rolled steel weldments instead of castings (making repairs easier when repairs are necessary)—these are examples of details that put Differential in the lead more than 25 years ago — and keep it there!

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OREGON

Greenhorn Mountain Development Company of Baker, Oregon has taken over the old *Pyx* gold mine in Grant County. Underground development work is proceeding and a 25-ton test mill is under construction. Ward L. Hill is general manager, Glen Ingles is mine superintendent, and Frank Kolkow is mill superintendent.

Ray Summers of Canyon City, Oregon is mining copper ore from his *Standard* mine in Grant County. Some cobalt has been exposed, but mining will be limited to copper ore for the time being.

The *Turner-Albright* mine in Josephine County, Oregon reportedly has been leased by *Granby Consolidated Mining, Smelting & Power Company, Ltd.* of Vancouver, British Columbia. Core and diamond drilling are being conducted, with Harvey Parliament in charge of the work. Several mineralized zones have been found on the surface. At one time efforts were made to produce gold from surface ore, and early underground work disclosed copper sulphides.

Newest limestone operation in Oregon is that of the *National Industrial Products Corporation*, a wholly owned subsidiary of *Morrison-Knudsen Company*. Extensive exploration and diamond drilling indicated high calcium limestone satisfactory for commercial development. Large crushing, conveying, and storage facilities were installed at the quarry four miles east of Durkee, Baker County. A railroad spur and siding have also been built. Present output averages about 500 tons a day.

WASHINGTON

Conconully Mines, Inc. is preparing to start production of silver-lead-zinc ore at the *Mohawk* mine near Conconully, Okanogan County, Washington. Some high-grade copper ore has been revealed at the *Peacock* mine, which the firm also is reopening. The company has leased the old American Graphite concentrator near Omak. A. E. Kaiser, Yakima mining engineer, is manager.

Knob Hill Mines, Inc. is extracting about 70 tons of gold ore daily from the Gold Dollar ore body adjoining its property at Republic, Ferry County, Washington. The *Gold Dollar* is leased from *Day Mines, Inc.* of Wallace, Idaho.

Washington Non-Metallics, Inc. has purchased a new portable crushing and screening plant for use at its 16 limestone and dolomite quarries near Chewelah, Stevens County, Washington. The plant will enable the firm to quadruple production. It will process 30 to 50 tons of rock an hour, depending on type. The firm has been operating a stationary plant at Chewelah. It produces marble chips, stucco dash, and roofing chips. Gordon LaVigne of Chewelah is vice president.

Colorado Mine Association Sets Convention Dates

February 3, 4, and 5, 1954 are the dates for the annual National Western Mining meeting, according to Marvin Kay, president of the Colorado Mining Association. The convention will be held in Denver, Colorado.

Program chairman for the meeting will be Frank Coolbaugh, Climax Molybdenum Company. He will be assisted by Vernon J. Pick, Delta Mines, Inc.; and Clyde V. Johnson.

Others in charge of arrangements are Merrit K. Ruddock, Cal Uranium Company, who is handling the Sow Belly Dinner; and D. E. Hoffman and B. C. Essig, who are planning the Uranium-Gold-Silver banquet.

Robert S. Palmer, executive secretary of the Colorado Mining Association, is convention manager.

Utah Uranium Stocks Total $11,500,000 for Year

More than $11,500,000 have been paid for uranium stocks in Utah during the past year with a total of 96 companies approved for underwriting by the end of August. A recent report by the state securities commission points out that the number of brokers licensed by the state has nearly doubled.

New uranium companies now doing business in the state include: Yankee Uranium Company, Black Hawk Uranium and Metal Company, Monarch Uranium Company, Mother Lode Uranium Company, Pathfinder Uranium Corporation, Inter-State Uranium, Inc., New Universe Uranium Company, Cherokee-Utah Uranium Corporation, Seagull Uranium Company, Diable Uranium Corporation, Imperial Uranium Company, Mount Peale Uranium Company, The Surplus Uranium Company, Monterey Uranium Corporation.

COLORADO

The newly formed *United States Lithium Company* will operate the *Brown Derby* mine near Gunnison, Colorado, it has been reported. The property was formerly owned and operated by *Poston Mining Company*, Canyon City, Colorado. The new firm, headed by Paul T. Walton, petroleum geologist and oilman of Salt Lake City, Utah, plans to construct a mill at the mine.

Uranium properties of the *Los Ocho Mining Company* have been purchased by Vance and Garth Thornburg, operators of the *Thornburg Mining Company*, Grand Junction, Colorado. The property, located on Cochetopa Creek in Gunnison County, Colorado, includes 31 claims, and was sold for $100,000 cash and 15 percent of the gross value on all uranium ore production. The Thornburg company already has a crew at work on the property and is shipping to Grand Junction. The discovery by the Los Ocho group several months ago has touched off a flurry of prospecting in the Cochetopa Creek area.

Absaraka Uranium, Inc. has begun ore shipments from the *Radium Queen* mine near Paradox, Colorado, to the U.S. Atomic Energy Commission depot at Uravan operated by *U.S. Vanadium Company*. E. U. Swalberg is in charge of mining operations for Absaraka.

Operations in the Rico, Colorado mining district have been started by *Minerals Mining and Milling Company*, recently formed by a group of Colorado Springs, Colorado and Phoenix, Arizona men. The *Union Carbonate* properties, containing several thousand tons of low-grade lead carbonate ore, have been leased by the firm and will be treated at the Edwards mill, north of Rico. Kenneth Erickson, formerly supervisor of construction and operation of the Rico-Argentine mill, will be in charge of operations. He expects to mill 100 tons of ore per day.

Lead and zinc operations at the *Silver Bell Mines Company*, Ophir, Colorado have been suspended, and the firm is making plans to enter the uranium mining business. The *Ophir* mine will be completely shut down after broken ore reserves have been pulled. The company has acquired several uranium claims on Monogram Mesa in Montrose County, Colorado and plans to begin drilling soon. A. A. Smith is general superintendent. *Four Corners Uranium Company*, Silver Bell subsidiary, has extensive uranium holdings in Utah.

Reports from Paradox, Colorado say that a rich uranium ore strike has been made by Andy Riddle, rancher in the area. The 5½-foot face of ore is in the Red Beds of northern Paradox Valley and is believed to be near the base of the Chinle formation in a 9-foot layer of coarse sandstone or conglomerate. Mr. Riddle plans to begin drilling soon.

M. W. Lambert has transferred his *Get Me Rich Quick* claim to the *Can-Du Uranium Company*, according to a mining deed filed in the Mesa County, Colorado clerk's office. Also at the Mesa County courthouse, a 10-year lease has been made by Clarence Austin, Jr. and Clarence Oren Austin, Delta County, to Spelman Prentice of Tarrytown, New York on *Jack Lode Nos. 1 to 5, Buck Horn Nos. 1 to 16, Sunlight Nos. 1 to 7*, and *Mule Trail Nos. 1 and 2*. The lease calls for 12½ percent of all ore values to be paid to the Austins.

Mining operations are getting under way on the Lloyd Tuttle ranch, nine miles west of Glenwood Springs, Colorado where uranium-bearing ore was discovered the latter part of August. Prospecting rights and a five-year lease on the property, which will be called the *Revelation* mine, have been taken out by four Glenwood men, Bill McDonald, Imo McDonald, Elmer Ridgeway, and Ted Moore. Assays show 0.20 to 0.275 ore at the surface, with the grade rising on underground samples.

Edna Coal Company, operators of the *Edna* coal mine south of Steamboat Springs, Colorado, have begun extensive uranium exploration in the Soda Creek canyon area, Routt County, Colorado. A lease on five claims, called the *Forty-five* claims because of their 45° angle, has been signed by the company, and heavy machinery has been moved in to determine value of the ore. E. P. Moe, mining engineer for the firm, is in charge of the work.

A uranium strike has been reported near the Colorado River in northern Eagle County, Colorado, by Bill Orgish. The strike was made on 200 acres of land west of Mr. Orgish's ranch. Claims on the property have been taken out by Clarence Kennedy and Elmer Clodfelter, Eagle; Hank Robbins, and Mr. and Mrs. Paul Orgish, McCoy; Joseph Skiles, Burns; Dr. James Leslie, Oak Creek; and Jack Rose, Golden.

VCA's 150-Ton Roaster Arrives at Durango

Vanadium Corporation of America's new 150-ton roaster is shown above reaching the firm's uranium mill at Durango, Colorado. Brought by a fleet of trucks from Gabbs, Nevada, the roaster was installed at the plant and put into full operation by October 1 at the Durango mill, which processes ores from Utah, Colorado, and Arizona. In addition to the Durango plant's expansion, VCA is constructing a concentrator for low-grade vanadium and uranium ores near its Monument No. 2 mine in Apache County, Arizona. This reportedly will be the first full-scale operation on concentrating ores below the AEC grade schedule for raw ore.

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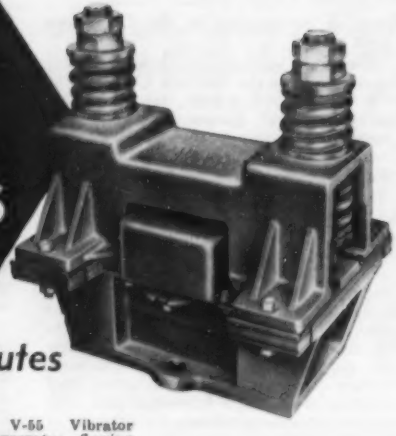

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SOUTH DAKOTA

Key Chemical Company, South Dakota firm, has erected a beryl processing plant near Orreville, South Dakota. Capitalization of the firm, which was incorporated during July, is listed at $600,000. Directors are C. M. Speer, Pierre; A. I. Johnson, Keystone; and R. J. Oltmans, Spearfish.

Del Mundo Uranium Development Company, Rapid City, South Dakota, recently incorporated with a capitalization of $900,000. Directors are R. E. Hayes, Keith L. Rising, and N. E. Stolquist, of Bismarck, North Dakota; S. L. Craig, Pocahontas, Illinois; and Warren May, Pierre, South Dakota.

UTAH

Bullion Monarch Mining Company has changed its name to *Bullion Uranium Company*, coincident with its extensive uranium operations. The company has announced the lease of four uranium claims in Utah's Marysvale district to *Vanadium Corporation of America*. The claims, leased for five years with option renewable by Bullion, include *Farmer John* and *Farmer John Nos. 1, 2, and 3*. The Bullion firm also announced a 100 percent stock dividend at a recent general meeting.

Dragon Consolidated Mining Company, Utah halloysite clay producer, has announced a 10-cent dividend, the largest in its 43-year history. The dividend is the first one declared by the firm, an affiliate of *North Lily Mining Company*, in 30 years. Production of halloysite from the Eureka district mine is between 6,000 and 8,000 tons per month. For several years the company has had an agreement with *Filtrol Corporation*, which receives the clay at its plant in Salt Lake City, Utah.

Western Uranium, Inc. has been organized as the operating company for *Western Silver-Lead Corporation* and *Square Deal Mining and Milling Company* of Wallace, Idaho in exploring their Utah uranium prospects. Drilling of the *Juanita* group in Grand County's Yellow Cat area is under way under general direction of Norman Ebbley, former Wallace mining engineer. An option has been taken on a 37-claim property in San Juan County. A. H. Featherstone is president of Square Deal. George Grismer heads Western Silver-Lead.

Ray Drilling Company, Inc., Denver, Colorado, has opened branch offices in Salt Lake City, Utah. The company specializes in seismograph shot hole drilling and core drilling of mineral deposits and presently has six drills in operation in the Rocky Mountain area.

The *Palo Alto Uranium Company* Moab, Utah has shipped its first load of ore to the *United States Vanadium Company's* receiving depot at Thompsons, Utah. Twenty tons were shipped from

the 10 claims of the group, located on 600 acres 15 miles south of Green River, Utah. The claims were leased from the *Moab Uranium Company* and future plans call for both wagon hole and diamond drilling. The Palo Alto firm is composed of five California men, Frank Madison, Robert Brinker, E. M. and J. A. Pool, and C. J. McClellan, Jr. Mr. Madison, a geologist, is general manager of the company.

Vulcan Uranium Mines, Inc., Wallace, Idaho, has exposed a mineralized area 300 feet long and 3 to 7 feet wide in bulldozing its 10-claim prospect in the San Raphael swell area, Emery County, Utah. The claims were obtained from W. W. Sweet, Green River, who is in charge of operations for Vulcan Uranium. H. J. Rossi is company president.

Inspiration Lead Company, with a prospect northwest of Wallace, Idaho, has found a four-foot-thick mineralized area on its recently acquired eight-claim property in San Juan County, Utah. The firm has asked for a $15,000 appropriation to open the ore zone. W. H. Simons, the company's consulting engineer, is in charge. He has opened a branch office in Moab.

U. & I. Uranium, Inc., Kellogg, Idaho, operating company for six Kellogg mining firms associated in uranium exploration in San Juan County, Utah, is considering a stock offering to finance further work on its *Radon* and *Hot Rock* groups. An "excellent" ore showing was reportedly found in the first hole drilled at the Radon.

National Uranium Corporation, formerly *Croesus Gold Mining Company*, of Wallace, Idaho, is drilling a property in the Seven Mile area north of Moab, Utah. It has another property under lease in the Coyote, Wash., district, San Juan County. It has agreed tentatively to explore three groups of Utah leases held by *Silver Buckle Mining Company*, Wallace, under a profit-sharing arrangement. Roy H. Kingsbury is secretary. On adjoining holdings *Hypotheek Mining and Milling Company*, Wallace, Idaho, is drilling its second hole and reports favorable results in the Morrison formation at about 430 feet.

The general council of the Ute Indian tribe, Fort Duchesne, Utah has given tribe members a six-month priority over non-members in prospecting on the Uintah-Ouray Reservation. Prospecting for uranium will be limited to members during that time in the area. During the past six months several hundred uranium claims have been filed in Duchesne County.

Mott Core Drilling Company, Huntington, West Virginia, has been awarded a contract by the United States Geological Survey for additional exploratory core drilling on the Colorado Plateau. The firm, which maintains a branch office in Grand Junction, Colorado, will conduct a total of 90,000 feet of drilling in the Monogram Mesa area of Montrose County. It is also conducting an 80,000-foot drilling program in the Blanding, Utah area.

Caledonia Silver-Lead Mining Company, Kellogg, Idaho, has reported exceptionally encouraging results from initial drill work at the *Hot Rock* and *Radon* groups in southern Utah. It is one of six Kellogg mining companies associated in exploration of the Utah properties.

WYOMING

Loma Uranium Company of Denver, Colorado, has bought all stock and assets of the *American Uranium Company*, Douglas, Wyoming. The transaction involved 58 claims, covering approximately 100,000 acres in the Wind River and Powder River basins. American has confined its operations for the past few months to exploring and leasing, but it is reported that the Denver firm plans to begin ore production soon.

Controlling interest in the new *Cohall Uranium Mining and Development Corporation* of Greybull, Wyoming, has been bought by *Rocky Mountain Refinery, Inc.* of Loveland, Colorado. Rex Rhoades, president of the Colorado firm, and E. C. Simian, field man, report that $150,000 will be spent in exploring and developing 31 Bear Creek area claims, east of Greybull.

Sateco Uranium Company, Lander, Wyoming, has shipped 17 tons of ore to *The Climax Uranium Company* in Grand Junction, Colorado from its uranium deposit in the Gas Hills area, Fremont County. An amenability test will be run on the ore to check whether Climax's milling process is suitable to the ore being mined by Sateco. If the test proves satisfactory regular shipments of the ore will continue. The ore body was discovered several months ago as a result of night time prospecting with the use of an ultraviolet light.

Test drilling and exploration on a 20-claim uranium lease in the Crooks Gap area, Fremont County, Wyoming has been started by *Old Faithful Uranium Company*. Supervising operations is Wallace G. Bell, Laramie, Wyoming. The claims are adjacent to the *Sno-Ball* group, from which considerable ore is reportedly being shipped to the *Vitro Chemical Company* mill in Salt Lake City.

Selenium deposits have been reported in the Baggs, Lusk, and Lysite areas of Fremont County, Wyoming. State geologist H. D. Thomas is conducting experiments on samples of the deposits, whose richness and extent are unknown.

Additional shipments of uranium ore from the *Sno-Ball* claims in the Crooks Gap area of Fremont County, Wyoming have been reported. The Sno-Ball group was the first in Fremont County to receive a lease from the AEC under provisions of Circular 7. Jack Igo, Cokeville, Wyoming, heads the firm.

Norbute Corporation, Montana copper producer, has acquired 150 uranium claims in Utah's Grand and San Juan counties and has leased 23,000 acres in Wyoming's Carbon, Fremont, Sweetwater and Sublette counties. Airborne scintillation meter surveys have been carried out over most of the Wyoming area, and definite signs of radioactivity have been recorded.

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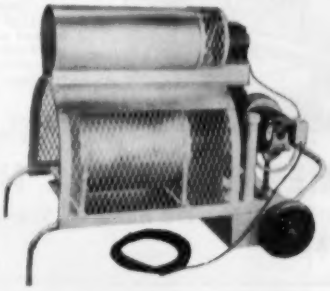

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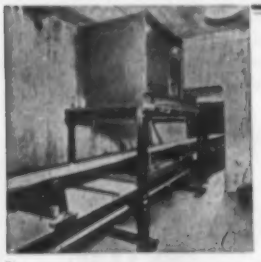

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Annual Southwest Mining Sessions at Carlsbad

Several hundred mining industry representatives from throughout New Mexico, Texas, and other neighboring states are expected to attend the 1954 annual convention of the New Mexico Mining Association and the Southwestern International Mining Association in Carlsbad, New Mexico October 14, 15, and 16.

Program chairman Earl H. Miller, assistant manager of United States Potash Company, has announced the following speakers for the technical sessions: Robert M. Moore, manager mining department, industrial engineering division, General Electric Company, "Electric Equipment Application to Mining"; Dr. Alberto Thompson, technical information service, United States Atomic Energy Commission, Washington, "Coming Commercial Developments in Atomic Power"; Paul R. Leach, midwest manager, extension division, E. I. du Pont de Nemours & Company, "The Problem of Public Education Facing Business"; Dr. W. E. Shoupp, assistant manager, atomic power division, Westinghouse Electric Corporation, illustrated lecture on utilization of atomic power; Harold D. Wolfe, chief of Albuquerque sub-office, division of raw materials, A.E.C., "Uranium Prospecting in New Mexico."

Others addressing the convention include New Mexico Governor Edwin L. Mechem; Carlsbad's Mayor Adair Gossett; President Page Morris of the New Mexico Mining Association; President O. Paul Lance of El Paso International Mining Days; Sam Ahkeah, Navajo Indian Council chairman; Robert D. Grey, director of industrial relations and professor of economics and industrial relations, California Institute of Technology; Plato Papps, general counsel, International Association of Machinists, Washington; Milton C. Denbo, member of Poole, Shroyer, and Denbo, Washington; and Homer Hirsch, El Paso, Texas.

A controversy over five uranium properties on the Navajo Reservation in Arizona has been referred to the Indian Bureau in Washington, D.C., for a final ruling. *Black Mountain Uranium Company* of Colorado has protested assignment of uranium leases by the Navajo Tribal Council Advisory Committee to the *Chester Wright Mining Company*, also of Colorado. Involved in the dispute are five claims—the *Charles James No. 1, Tom Morgan No. 5, Henry Yazzie No. 5*, and *Herman Tsosie No. 1 and 2*. Navajo Indians had filed the claims and then assigned them to Wright for a percentage.

A part-time prospector, Alvin Warner, of Las Vegas, Nevada, has staked five claims in northern Arizona, and reports that he has uranium on them. Ore samples have been forwarded to the United States Atomic Energy Commission for testing. T. D. Robinson, also of Las Vegas, is a partner in the venture. They plan to stake at least 25 more.

200,000 acres of the Hualpai Indian Reservation in the northwestern part of Arizona have been opened for uranium exploration. A.E.C. aerial surveys have indicated radioactivity in the area. Exploration permits will be granted on the basis of the highest cash bonuses offered the Indians, and the amount guaranteed for development. Permit holders will be eligible for 10-year leases on their discoveries, and no permits will be given for gas or oil exploration.

B. S. & K. Mining Company, Inc. has been conducting a successful diamond drilling campaign at its *Atlas* mine near Red Rock, Arizona. The firm stopped its zinc production in January when the price of zinc went down and turned its efforts to diamond drilling. They located an 18-foot vein of 7% percent copper ore with very little zinc and now will soon be producing copper concentrates. They resumed zinc mining in June when the zinc price rose to 11¢ because they were able to make a profit at that price with their high-grade ore. Zinc heads average around 28 percent and their concentrates around 58 percent. The firm's copper concentrates average around 30 percent.

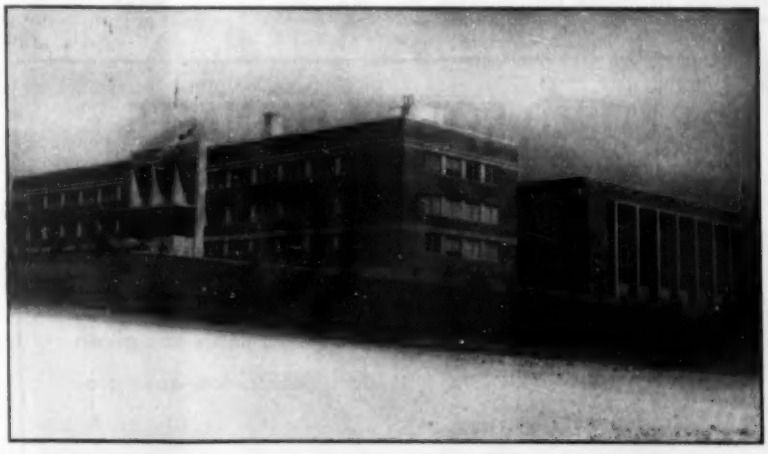
The large government-owned magnesium plant at Manteca, California, will be converted for titanium production by *Western Pyromet Company* which has signed a 10-year lease. *Kaiser Magnesium Company* built the plant during World War II and operated it for two years before closing it down. Then in 1951 Kaiser reopened the plant at government request and operated it until 1953. B. D. Harden, general manager of Western Pyromet, estimates that it will cost about $8,000,000 to convert the plant to titanium production. The firm's goal is to produce 600 tons of titanium a year. Raw material for test operations will be purchased on the open market; later Pyromet's own operation in Nevada will supply much of the material.

Buckman Mines, Inc. near Cloverdale, California, is currently exploring the *Culver-Baer* cinnabar mine which it acquired earlier this year. A new exploration adit located 1,300 feet west and 150 feet below old workings is now being driven. A compressor-change house and Noble ore bin are being erected. The furnace plant is treating 100 tons of ore from the main mine operations per day.

A total of 64 claims have been staked in the Cedar Creek district near Glennville, California, in eastern Kern County by Harry Bronson and L. R. Peterson. Mr. Bronson located the *S.A. Nos. 1 through 12* and the *Betty L. Nos. 1 through 12*, while Mr. Peterson located the *Valley View Nos. 1 through 44*. Mr. Peterson is from Salt Lake City, Utah, and located his claims for *Uranium Services Inc.* About 18 miles southeast of Maricopa, O. E. Secrest of Taft located the *Lone Pine* uranium claims, while Harry Sorensen, Robert Yager, and Charles Lightfoot located the first uranium deposit in San Luis Obispo County. Their claim is in the Park Hill area.

M. L. Burrell is producing some quicksilver at the leased *Wall Street* mine on Dry Creek about five miles southeast of Middletown, California. He has reopened the lower adit for about 150 feet and has installed a single-pipe Rossi-type retort to treat the ore.

The *Black Rock Mining Corporation* of Bishop, California has changed its name to the *Wah Chang Mining Corporation*. No changes in organization are planned. The firm's parent company is the *Wah Chang Corporation* of New



New Experiment Station Dedicated at Reno

The new Rare and Precious Metals Experiment Station of the United States Bureau of Mines (shown above) was dedicated on September 25th at Reno, Nevada. The ceremony was attended by distinguished mining men from all parts of the nation. The research building contains 57,000 square feet of laboratory and office space, and is adjacent to the campus of the University of Nevada on land deeded to the Federal Government by the State of Nevada. Under the recent reorganization plan of the Bureau of Mines, Reno is scheduled to become the headquarters for Region I, which will include Washington, Oregon, Idaho, California, Nevada, and the Territory of Alaska. These offices will be housed in the new building.

York. The company operates the *Benton* tungsten mine 35 miles northwest of Bishop, and the *Lincoln* mine at Tempiute, Nevada.

The San Bernardino County Board of Supervisors are opposing the opening of Joshua Tree National Monument to prospectors. The Riverside County Board favors the opening of the 500,000 acres. Final action lies with Congress. Walter A. Locke of Long Beach, and Bill Mehegan of Paramount, California have staked eight claims totaling 160 acres in the Joshua Tree-Yucca Valley district.

Kaiser Aluminum and Chemical Corporation is carrying on a major development program in its *Kaiser* fluorspar mine near Gabbs, Nevada. The shaft has been deepened from the 400 to the 600 level and is now being sunk from the 600 to the 800 level. Ore will be trucked to the company's mill at Fallon.

The *Nevada-Massachusetts Company* at Tungsten, Nevada, is now mining and milling 500 tons per day. Ore from the company's open pit supplies 125 tons a day to the mill, while 375 tons are mined in the deep shafts.

Mark Bradshaw has purchased his partner's interest in *Technical Operators, Inc.* and has now assumed complete control of the firm. The company owns the *Dewdrop* and *Red Devil* claims in the Diamondfield mining district near Tonopah, Nevada.

Uranium Mines, Inc. is making progress with sinking of its shaft at its *Smoky Valley* tungsten property in Nevada. The shaft is now down 170 feet and will be sunk another 180 feet to total 350. Water was encountered at the 132-foot level but pumps have managed to solve this difficulty. At present they are pumping 10 to 15 gallons per minute. A 200-ton mill is being built and the firm hopes to install mill machinery soon.

Grand Deposit Mining Company reports that it has struck high-grade lead-gold-silver ore at its property in the Silver Mountain mining district of White Pine County, Nevada. The discovery was made on the 800-foot level northwest of the main Grand Deposit shaft in virgin ground.

Calumet & Hecla, Inc. plans to prospect, at depth, the *Summit King* mine near Tonopah, Nevada, after *Tonopah Development Company* surrenders its lease on the property. The mine is owned by C & H who leased it to *Homestake Mining Company* and *Summit King Mines;* together they operated it as *Tonopah Development Company.* Development work by the latter group included driving of a 900-foot crosscut from the old King Tonopah shaft on the 300-foot level where an 8- to 10-foot-wide vein was cut. The level was developed and a winze sunk to the 550 level where additional lateral exploratory work was conducted. Some shipments were made but the firm decided the ore body was not as large as at first believed and decided to give up the project. Calumet plans to prospect at greater depth—possibly 750 feet and below.

Marjorie and Charles Goodwin have staked 25 claims in Fish Lake Valley, Nevada, which appear to have strong uranium indications. The couple have signed an agreement with *TVG Mines Company* of Tonopah for development work. The deposit is said to contain autunite, carnotite, and pitchblende. Mark L. Young is stripping the overburden with a caterpillar tractor.

Engineers working on oil drilling operations near Arden, Clark County, Nevada, for *Intermountain Associates* are reported to have discovered uranium ore. Some 20 claims are now being staked by the company.

The *Pacific Matchless* gold-silver-lead mine near Lovelock, Nevada has been sold by Mrs. Amelia Murphy to a Reno party whose identity has not been revealed. All equipment at the mine was included. The mine will probably be worked as an open pit operation.

Among the recent uranium companies in New Mexico is *Water Canyon Uranium Mining & Metals Company.* Incorporators are George S. Clements of Socorro, Foster H. Burchett of Roswell, and Paul R. Lewallen of Hampton, Virginia. Another is *Chief Uranium Company, Inc.* formed by Thomas O. Evans, C. G. Gunderson, and Earl C. Iden. Also: *Shiprock Uranium Corporation* chartered by T. F. Gholson, Inc., G. A. Reynolds, and R. D. Byars; *Continental Uranium Inc.,* by H. K. Webb, H. C. Broadt, and A. D. Atwell; *Sabinessa Exploration Development Company,* by W. Carlos Powell, J. H. Bliss, and J. E. Perry; and *Deming Mines, Inc.* by Ismael Gallegos, Ernest Flores, and George Measday.

Luck Mining and Construction Company has resumed manganese mining operations on a curtailed basis at its *Boston Hill* mine near Silver City, New Mexico. The firm stopped making shipments early this spring because of a slackening demand for steel at the *Colorado Fuel and Iron Company* plant at Pueblo. Luck has been shipping to Pueblo since 1937.

The National Farmers Union, which now has under lease or option some 17,000 acres of potash-bearing mineral land in New Mexico, announces that it will construct a $10,000,000 to $12,000,000 potash plant in the southeastern part of the state. The company reportedly is negotiating for leases on about 30 sections of land in Eddy and Lea counties.

Chapman and Wood of Albuquerque, New Mexico, announce that their laboratory division is now equipped to make uranium assays on a custom basis. Analytical procedure is under the direction of Dr. D. H. Reynolds, who has been in charge of the lab since 1951.

Three Socorro, New Mexico residents are reported to have received $75,000 for 51 claims in the Lemitar Mountains about four miles north of Socorro. The three discoverers, Gordon Tolliver, Ray Carter, and Boyce Cook, also received a 15 percent royalty agreement. Purchasers were a Chicago group of investors, with Sid Cohen acting as spokesman for them. The ore is reported to be on top of the ground in volcanic dikes. The AEC has a field party out checking the claim.

The 8th Annual Midwestern meeting of the Society of Exploration Geophysicists will be held November 18 and 19 at the Adolphus Hotel in Dallas, Texas. More than 1,000 exploration scientists

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Mifflin Mining Company Starts Lead and Zinc Production After Moving Mill to Mine Site

Mining and milling operations have started at the Mifflin Mining Company's property in Mifflin, Wisconsin after moving of the zinc-lead flotation mill from the edge of Mifflin to the Cokerville mine site about 3¾ miles away. (See MINING WORLD, July 1954, page 97). Centralization of operations will lower operating costs by eliminating expensive truck haulage.

The mill feed of 250 tons a day is being mined through an adit, with the ore trucked from underground mining faces directly to the mill's primary crusher. The ore is zinc-lead (sphalerite and galena) averaging 5.5 percent zinc with minor amounts of lead. This is preconcentrated with jigs to furnish a flotation feed of 120 tons.

The truck dumps its load of mine ore into a 30- by 42-inch Universal jaw crusher set at 4 inches. The crushed product drops to a belt feeder which feeds a conveyor discharging into a 150-ton hopper. From this hopper, ore drops through a chute to a 10- by 24-inch Universal jaw crusher set at ¾ inch. From here it enters an elevator that discharges into a ¾-inch trommel screen.

Oversize from the trommel screen is crushed with a set of 15- by 30-inch rolls, set at ¾ inch, and then returned to the elevator. Trommel screen undersize enters an 18-foot classifier which discharges to a 5-cell, 36- by 42-inch, steel jig. Tailing from the jig drops onto a belt conveyor and is carried to the tailing pile. The hutch product of the first jig cell is sent to a Denver Duplex mineral jig for recleaning to produce a lead concentrate.

Tailing from the lead jig joins the concentrate from the 5-cell jig and is pumped to a 22-foot classifier. Overflow from the classifier flows into a thickener. Classifier underflow is discharged into a 100-ton storage bin. A belt conveyor feeds from this bin to a 6-foot by 28-inch Hardinge conical ball mill in closed circuit with an 18-foot classifier. Underflow from this classifier, plus-65-mesh, is returned to the ball mill. Overflow is pumped to a bank of four Denver No. 18 Special flotation cells which comprise the lead circuit. Three cells are used as roughers and one cell as a cleaner. Cleaner froth goes to a Deister slime table for further cleaning.

Lead flotation tailing enters the zinc circuit, first going to a 5-foot conditioner before passing on to a bank of 10 Denver Sub A cells. Cell Numbers 3 to 10 are used as roughers. Froth from the last six cells goes to the Number 2 cell which is the cleaner. Froth from the Number 3, 4, and 2 cells enters the Number 1 cell, the recleaner. Zinc concentrate is dried with a 6-foot, 2-disc American filter.

Flotation tailing flows by gravity to a pump house where a 3-inch pump forces it to the tailing pond which consists of about 10 acres and contains three settling basins.

Clear water from the thickener is drawn off and added to the five-cell jig and also to the ball mill classifier. Make-up water is supplied from the mine. The mine is also dewatered by gravity, the water flowing out the adit. Mine water is pumped to a 1,000,000-gallon earthen reservoir near the mill. From this reservoir it flows into a 50,000 gallon concrete storage basin from which it is pumped into the mill. A well serves as a standby water supply in case of an emergency.

Milling is done on a round-the-clock basis. Primary crushing is done on only one shift, while gravity milling takes two shifts, and the flotation section runs three shifts.

The controlling interest in the Mifflin Mining Company is owned by the Herb Turner, Jr. & Sons Construction Company of Boscobel, Wisconsin. John F. Howland is part owner and manager.

ASARCO Drills for Copper On Maryland Farms

The American Smelting and Refining Company is reported to be drilling for copper on a group of farms the firm has optioned in Frederick County, Maryland. The tests are expected to determine whether the firm will exercise its option to mine these properties. Copper mining was an important industry in this area during Colonial times.

Drilling Symposium At University of Minnesota

The success of the drilling symposium at the University of Minnesota in 1952 and 1953 has led the University to offer another symposium on the main campus in Minneapolis October 14, 15, and 16.

Tentatively scheduled are sessions on Cement and Grouting"; "Drilling Techniques"; "Diamonds for Drilling"; "Soil Testing"; and a general discussion of miscellaneous new devices and practices, such as pulling rods from holes; discharge pumps; diamond core drilling with air, non-coring diamond bits, development in diamond drill bits in Africa.

All of the assets of *Hegeler Zinc Company* of Danville, Illinois have been acquired by the *National Distillers Products Corporation*. Hegeler owns a sulphuric acid plant at Danville, only 50 miles from the acid plant of National Distillers' U.S. Industrial Chemical Division at Tuscola, Illinois. This will bring to four the number of plants National will have producing sulphuric acid. The zinc rolling mill acquired under the same purchase will probably be sold.

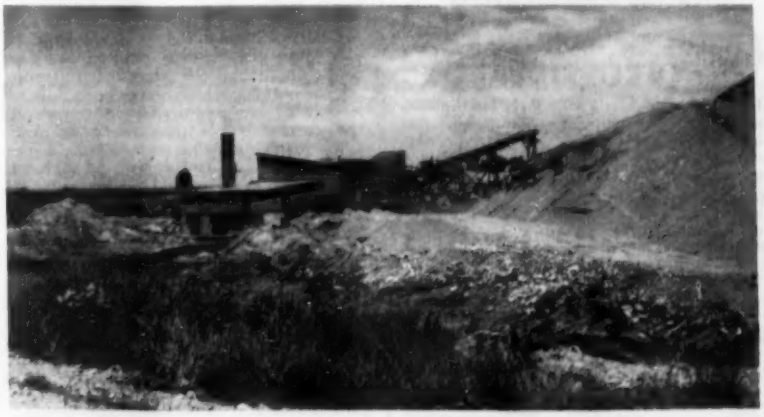
The *U.S. Atomic Energy Commission* is considering an expansion of its uranium processing facilities in the St. Louis, Missouri area. If the $40,000,000 expansion takes place, it is believed that *Mallinckrodt Chemical Works* would operate the facility. Among the sites being considered is Weldon Springs, Missouri, the former location of an ordnance plant.

A plane and ground crew, headed by Bud Ray of Medora, North Dakota, are covering southwestern North Dakota with uranium prospecting equipment. They are representing the *Mineral Mining Company* of Cody, Wyoming.

The *Miller and McGee Manganese Corporation* has been incorporated at Batesville, Arkansas by Marshall McGee, Herman Miller, and J. H. Martin.

The U.S. Bureau of Mines is currently seeking practicable methods for using large potential columbium resources in Arkansas. Under a contract with the Emergency Procurement Service, General Services Administration, the Bureau is conducting laboratory and pilot plant research on recovery of columbium from titanium minerals found in central Arkansas and from tailings of alumina plants using certain Arkansas bauxites. The titanium mineral deposits and bauxites of central Arkansas contain about 0.07 percent columbium and total reserves are estimated at over 78,000,000 pounds of columbium metal. The annual alumina plant feed, at full capacity, would contain about 3,600,000 pounds of columbium.

The Tennessee Valley Authority believes that there is a considerable amount



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of valuable scrap mica in the silt that has accumulated in Davy Crockett Lake behind Nolichuckey Dam near Greeneville, Tennessee. The agency is willing for someone to recover it on a royalty basis. The portion of the lake and shoreline offered for working is about 215 acres and contains an estimated 4,500,000 tons of silt. The entire lake is 900 acres in area. TVA said that the mica entered the lake as a result of rock erosion and from mining operations in western North Carolina. The mining license is offered on a competitive basis.

Among the contracts recently approved by the Defense Minerals Exploration Administration are the following: C. E. Smith, Randolph County, Alabama, for mica, contract value $6,750, government's share $5,063; Beam & Boone, Avery County, North Carolina, for mica, contract value $1,816, government's share $1,362; Sam Phillips, et al, Macon County, North Carolina, for mica, contract value $5,538, government's share $4,154; W. D. and Mavos Baltzley, Powhatan County, Virginia, for mica, contract value $6,250, government's share $4,688.

Republic Steel Corporation has resumed mining operations at its iron ore mines at Lyon Mountain, New York. The mine has been closed since July 30.

Glidden Company will build titanium dioxide and sulphuric acid plants at Baltimore, Maryland. The first unit has already been started and is scheduled for completion in December 1955. It will cost $10,000,000 and will cover about 25 acres. Two additional units will eventually be built on the remainder of the property.

Sullivan Trails Coal Company is carrying on stripping operations near Cypher, Bedford County, Pennsylvania where a West Virginia firm started operations several years ago. The Sullivan firm has taken over this work and reports that an exceptionally good vein of manganese ore has been struck in prospecting. A three-yard dragline shovel and a large bulldozer have excavated to a depth of 52 feet where the vein was previously uncovered. Sullivan hopes to purchase its predecessor's equipment so that it will not have to bring in new equipment from eastern Pennsylvania. The over-all operation is under the management of *Sherman Valley Manganese Company*.

The Spruce Pine district of North Carolina is shipping dry mica at a rate of about 60,000 tons annually, with a yearly value of around $2,000,000.

The General Service Administration has given the Joint Committee on Defense Production the names of four mining operations which have been unable to fulfill their contractual obligations to the government because of "poor management or inadequately estimated ore deposits." The four companies, which the committee is expected to investigate immediately, are *Westmoreland Manganese Company* for a manganese mine and plant at Batesville, Arkansas, with more than $2,000,000 in government loans; *Appalachian Smelting and Mining Company* for zinc production at Embreeville, Tennessee, with $675,000 in government loans; *Mid-Continent Mining Company* for zinc production at West Plains, Missouri, with loans totaling $325,000; and *MacArthur Mining Company* for zinc production near Baxter Springs, Kansas, with a $45,000 government loan. The *United States Tin Corporation* is already under investigation.

Titanium sponge has been added to the government's official list of strategic and critical materials, bringing the total to 75. Stockpile purchases will begin as soon as specifications and storage conditions are determined.

Republic Steel Corporation has appropriated nearly $10,000,000 for expansion and improvements of its plant and equipment. This is the largest appropriation ever made by the firm since the steel industry production rate began to drop nearly a year ago. Largest part of the money will be spent in Ohio's Mahoning Valley with more than $5,000,000 scheduled for new equipment at the company's plants in Warren and Youngstown.

Jones & Laughlin Steel Corporation has started construction of a $1,500,000 research center in Pittsburgh, Pennsylvania. To be completed, in 1955, the center will consist of several buildings housing a staff of 10 people.

A rare uranium-bearing ore said to be soddyite has been found in a Georgia pegmatite on the Barnesville, Georgia farm of A. N. Moye. The ore was found in a mica mine on the property by Arthur Boone.

Data obtained by the United States Geological Survey in cooperation with the State of Maine Development Commission has been placed in open file for use by geologists and prospectors. Three preliminary total-intensity aero-magnetic maps of parts of Franklin and Somerset Counties, Maine were made in an airborne magnetometer survey.

The State of Minnesota opened bids from 13 mining companies on August 9th for leases to prospect for iron ore on the Mesabi, Vermillion and Cuyuna ranges. Of special interest was the *Mississippi No. 2* mine located near Keewatin on the Mesabi Range. This mine was operated by *M. A. Hanna Company* from 1933 to 1939 and is estimated to contain 1,700,000 tons of ore. Companies submitting bids on the property were Hanna, *W. S. Moore Company*, *Pacific Isle Mining Company*, *E. W. Coons Company*, and *Haley-Young Mining Company*. The state received 21 bids for 11 properties on the Mesabi range, 2 bids for two properties on the Vermillion range, and one bid for one property on the Cuyuna Range.

Lake Shore Engineering Companies built four new ore car dumpers for the *Pickands Mather & Co. Peterson* mine at Ironwood, Michigan. They are to be used for handling the ore cars that transport the ore from the drifts to the main shaft where the ore is dumped into pockets and then into bottom-dump skips for hoisting to the surface. These four dumpers are operated by compressed air, and will handle approximately 3,200 tons of ore every eight-hour shift.

Iron ore taxes paid to the State of Minnesota by companies engaged in mining are up $1,103,258 in 1953. Net payable taxes totaled $30,305,803.00, the highest amount in the history of the occupation tax.

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INDEX OF ADVERTISERS IN MINING WORLD

Agence Miniere & Maritime 76
Allis-Chalmers Mfg. Co., Gen. Machy. Div. 13
Allis-Chalmers Mfg. Co., Tractor Div. Inside Back Cover
Allison Steel Mfg. Co. 95
Alloy Steel & Metals Co. 68, 69
American Brattice Cloth Co. 3
American Cyanamid Co. 18, 19
American Smelting & Refining Co. 62
American Zinc, Lead & Smelting Co. 38
Anaconda Wire & Cable Co. 30
Arizona Testing Laboratories 93

Barber Greene Co. 92
Basic Refractories, Inc. 95
Bemis Bros. Bag Co. 74
Block & Deason 93
Boyles Bros. Drilling Co. 61
Boyles Bros. Drilling Co., Ltd. WM 28 (World Mining Only)
Buckman Laboratories 95
Bunker Hill & Sullivan Mng. & Concentrating Co. 38
Business Men's Clearing House 95

Card Iron Works, C. S. 77
Caterpillar Tractor Co. 2, 36
Colorado Assaying Co. 93
Colorado Fuel & Iron Corp. 57
Colorado Iron Works, Sub. of Mine & Smelter Supply Co. 16
Columbian Steel Tank Co. 66
Commercial Shearing & Stamping Co. 64
Continental Drilling Co. 93
Cosmopolitan Sales Co. 94, 95
Cowin & Co., Inc. 93
Cummins Engine Co. 18, 19

Darien Corp. 94
Deggendorfer, T. G. 93
Deister Concentrator Co. 78
Denver Equipment Co. 8, 9
Detroit Diesel Div., General Motors Corp. 34
Diamond Drill Contracting Co. 93
Dickinson Laboratories 93
Differential Steel Car Co. 84
Dorr Co. 12
Dow Chemical Co. 10
Drott Mfg. Co. 26

Edwards Co., E. H. 31
Elmco Corp. 7, Outside Front Cover
Engineers Syndicate, Ltd. 70
Euclid Road Machinery Div., General Motors Corp. 17

Federal Pipe & Tank Co. 95

Gallagher Co. 6
Gardner-Denver Co. 4
Gates Rubber Co. 28
General Electric Company, International WM 21 (World Mining Only)
General Motors Overseas WM 25 (World Mining Only)
Geo-Engineering 93
Goodall Brothers 93
Gould Co., Gordon I. 90
Greensburg Machine Co. 74

Hanks, Inc., Abbot A. 93
Hardinge Co. 72
Harnischfeger Corp. 11
Havlick Diamond Drill Co. 95
Hawley & Hawley 93
Hensley Equipment Co. 66

Indiana Foundry Co. 88
International Combustion, Ltd. WM 6 (World Mining Only)
International Harvester Co. 26
International Smelting & Refining Co. 88

Jeffrey Mfg. Co. 5
Johnson, Herbert Banks 76
Joy Mfg. Co. Inside Front Cover

Keegel, C. F. 93
Kirk Co., Wallace E. 94
Kruger Instruments, Harold 76

Ledoen Mfg. Co. 86
Ledoux & Co. 93
Leschen Wire Rope Div., H. K. Porter Co. 40
Link-Belt Co. WM 70, 71 (World Mining Only)
Lundberg Explorations, Ltd. 76

Mace Co. 66
Mack Motor Truck Corp. 32
Mack, Peter 93
Magma Copper Co. 88
Marion Power Shovel Co. 20
Merrick Scale Mfg. Co. 88
McClintock, R. S. 93
Miller, Arnold H. 93
Mine Safety Appliances Co. 14
Mine & Smelter Supply Co. 16
Moab Uranium Co. 88
Morse Bros. Machinery Co. 94
Murphy, F. M. 93

National Malleable & Steel Castings Co. 1

Pacific Foundry Co., Ltd. WM 66 (World Mining Only)
Pacific Pipe Co. 94
Peale, Rodgers 93
Pioneer Engineering Works 15
Precision Radiation Instruments 92
Price, Franklin L. C. 93

Resisto-Loy Co. 62
Ruderman Machinery Co. 95

Scandinavian Ore Tankers, Inc. 93
Shedwick, Jr., William J. 93
Sheffield Steel Corp. WM 27 (World Mining Only)
Silent Glow Oil Burner Corp. 87
Simplex Wire & Cable Co. 59
Sintering Machinery Co. 78, 95
Smith-Emery Co. 93
Smith, Paul F. 94
Sprague & Henwood, Inc. 78
St. Clair, John Q. 93
Standard Oil Co. of Calif. 25
Still, Arthur R. 93
Sturtevant Mill Co. WM 24 (World Mining Only)
Syntron Co. 82, 86

Terry, Joseph 95
Thermoid Rubber Co. 39
Thor Power Tool Co. WM 22, 23 ((World Mining Only)
Timken Roller Bearing Co. 27
Traylor Eng. & Mfg. Co. 21

Udy, Marvin J. 93
Union Oil Co. 35
U. S. Steel Corp. 71

Van Waters & Rodgers, Inc. 93
Vulcan Iron Works 79

Walvoord, Inc., O. W. 93
Wedge Wire Corp. 70
Western Machinery Co. 24
Western Precipitation Corp. 29
Westinghouse Electric Co., International WM 26 (World Mining Only)
Wickwire Spencer Div., Colo. Fuel & Iron Corp. 57
Wilfley & Sons, A. R. Outside Back Cover
Wilfley, Clifford R. 93
Wilson, Glenn B. 94
Wolf, Harry J. 76
Wood Assaying Co., Henry E. 93

Yuba Mfg. Co. 75

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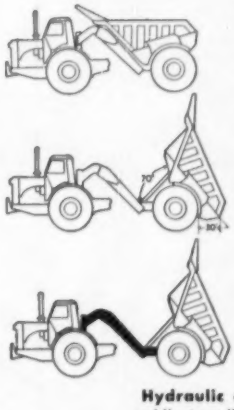

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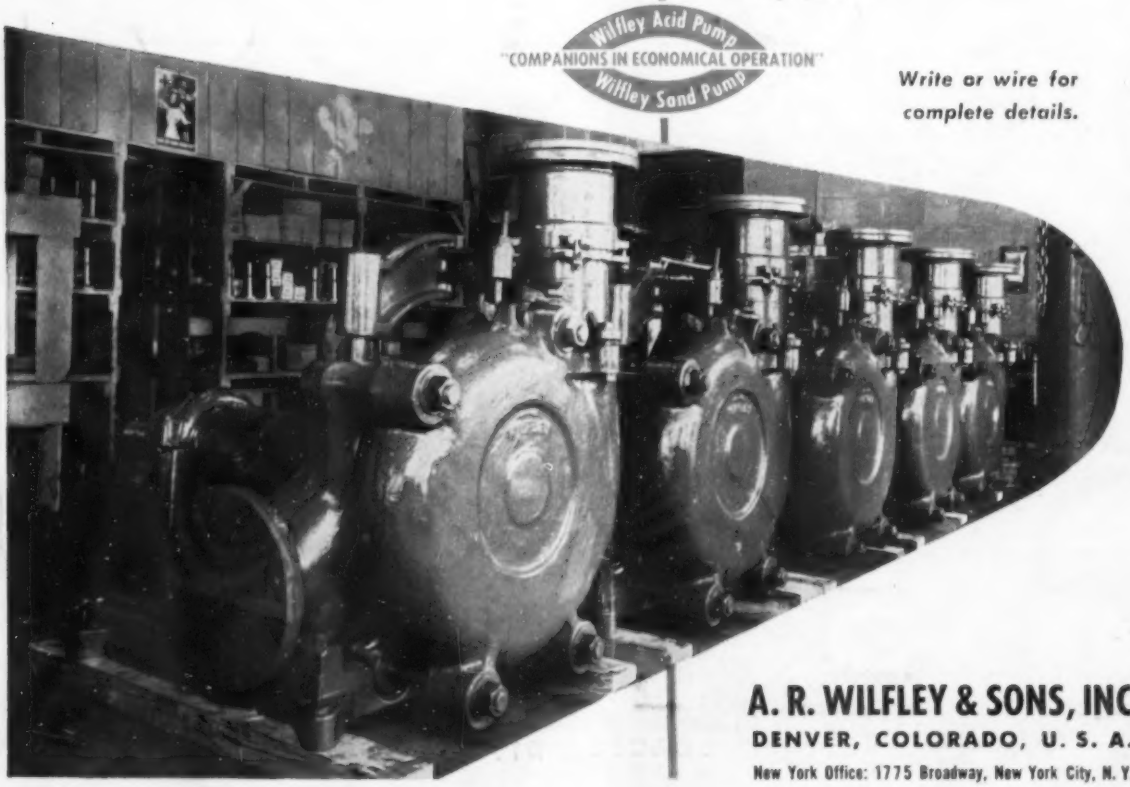

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